SONY

VIDEO CASSETTE RECORDER

SVT-72P

SERVICE MANUAL

1st Edition

VHS

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠ AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

ADVARSEL!

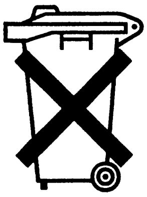
Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

Voor de klanten in Nederland

Dit apparaat bevat een MnO_2-Li batterij voor memory back-up.

Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat bij einde levensduur afdankt.

Gooi de batterij niet weg. maar lever hem in als KCA.



Bij dit produkt zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

Für Kunden in Deutschland

Entsorgungshinweis: Bitte werfen Sie nur entladene Batterien in die Sammelboxen beim Handel oder den Kommunen. Entladen sind Batterien in der Regel dann, wenn das Gerät abschaltet und signalisiert "Batterie leer" oder nach längerer Gebrauchsdauer der Batterien "nicht mehr einwandfrei funktioniert". Um sicherzugehen, kleben Sie die Batteriepole z.B. mit einem Klebestreifen ab oder geben Sie die Batterien einzeln in einen Plastikbeutel.

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SONY®

3-203-312-01(1)

Videocassette Recorder

Operating Instructions page 2

Before operating the unit, please read this manual thoroughly, and retain it for future reference.

SVT-72P

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WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

CAUTION

The format used for time lapse recording in this video cassette recorder differs from the regular VHS video format. Cassettes recorded in three-hour mode on this unit can be viewed on a normal VHS video cassette recorder. However, cassettes recorded in time lapse modes may show some picture noise when played on a normal VHS video cassette recorder.

Voor de klanten in Nederland

- Dit apparaat bevat een MnO_2-Li batterij voor memory back-up.
- De batterij voor memory back-up van het geheugen is bevestigd op Z8901 van platt TB-2.
- Raadpleeg uw leverancier over de verwijdering van de batterij op het moment dat u het apparaat bij einde levensduur afdankt.
- Gooi de batterij niet weg, maar lever hem in als KCA.
- Bij dit produkt zijn batterijen geleverd. Wanneer deze leeg zijn, moet u ze niet weggooien maar inleveren als KCA.

CAUTION

Danger of explosion if battery is incorrectly replaced.
Replace only with the same or equivalent type recommended by the manufacturer.
Discard used batteries according to the manufacturer's instructions.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til laverandøren.

ADVARSEL

Eksplosjonsfare ved feilaktig skifte av batteri.
Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten.
Brukte batterier kasseres i henhold til fabrikantens instruksjoner.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt fabrikantens instruktion

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Section 1
Operating Instructions

This section is extracted from operation manual.

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Precautions

On safety

- Operate the unit on 220 - 240 V, 50 Hz only.
- The nameplate indicating operating voltage, power consumption, etc., is located on the rear of the unit.
- Should any solid object or liquid fall into the cabinet, turn off the power, unplug the unit and have it checked by qualified personnel before operating it any further.
- Do not drop or place heavy objects on the power cord. If the power cord is damaged, turn off the power immediately. It is dangerous to use the unit with a damaged power cord.
- Connect the power cord to the wall AC outlet.
  For connecting the power source, see "Connecting a Camera, Monitor and Microphone" on page 8.
- Unplug the unit from the wall outlet if it is not to be used for several days or more.
- Disconnect the power cord from the wall AC outlet by grasping the plug, not by pulling the cord.

On installation

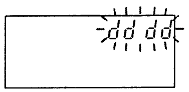
- Do not place a heavy object on the unit.
- Allow adequate air circulation to prevent internal heat build-up.
  Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the unit in a location near heat sources such as radiators or air ducts.
- Place the unit to avoid direct sunlight.
- Do not install the unit in a place subject to mechanical vibration or shock.
- Do not put magnetic objects close to the unit and cassette tape. Magnetic fields may affect the color reproduction of the unit and cause distortion.
- The unit is designed for operation in a horizontal position.
  Do not install it in an inclined position.

On operation

When the unit is not in use, turn the power off to conserve energy and to extend its life.

On moisture condensation

If the unit is brought directly from a cold to a warm location, moisture may condense on the video head drum. In this condition, the tape may adhere to the head drum and cause serious damage to the head. To avoid damage caused by moisture condensation, be sure not to leave a cassette inside the compartment when the unit will not be used. If moisture condensation is present, the "dddd" indicator flashes in the display window and the unit will not operate. When the "dddd" indicator disappears, you can operate the unit.



On video cassettes

Remove and store video cassettes after recording or playback.

On cleaning

As a safety precaution, unplug the unit before cleaning it.

- To keep the unit looking brand-new, periodically clean it with a mild detergent solution. Never use strong solvents such as thinner or benzine, or abrasive cleaners since they will damage the cabinet.
  When cleaning, keep liquid away from electrical contacts and connectors.
- When there is a buildup of dust on air vents, use a vacuum cleaner to remove it.

On repacking

- Before repacking, disconnect all cables and connecting cords.
- Do not throw away the carton and packing materials. They make an ideal container with which to transport the unit. When shipping the unit to another location, repack it.

On transportation

When transporting the unit, protect it from vibration and impact.

If you have any questions about this unit, contact your authorized Sony dealer.

Features

Field recording/field playback

Because single fields can be recorded one by one in time lapse mode and all fields can be viewed separately during playback, you can record more information.

Various recording functions

- **Repeat recording:** When the tape reaches the end, the VCR rewinds the tape and starts recording again from the beginning of the tape.
- **Timer recording:** You can set the timer on daily recording or weekly recording.
- **Alarm recording:** If an externally connected alarm sensor is triggered, you can make a complete recording of the situation that triggered the alarm.

Mode settings on monitor

You can set the modes for all functions, such as the internal timer setting, the alarm recording mode settings, etc., on the monitor.

Series recording function

This function permits long-term continuous recording using two or more time lapse VCRs.

Multiple recording modes

The time lapse intervals for recording can be set in 4 steps. At the longest interval setting, available recording time is a full 72 hours with one 180-minute tape.

Clear picture

This VCR uses the Reality Regenerator IC, which makes it possible to produce a clear picture.

RS-232C/RS-485 connectors for computer

You can control this VCR from a personal computer or a controller connected to the RS-232C or RS-485 connectors.

Recording the alarm data at the top of the tape

You can set to record up to 100 alarm data (count, date and time) at the beginning of the tape. These data can be displayed on the monitor screen.

Clog detection

The VCR always checks that the video signal is recorded without problem (in time lapse mode only). If the recording cannot be made properly because the recording head has become clogged, the VCR will give a warning and also switch to the sub-head to continue the recording.

Time and date retrieval function

Because this unit uses a high-performance VASS, recordings made in time lapse mode can be searched by date and time (hour and minute up to every 10 minutes), a valuable type of search function in time lapse VCRs.

Forward/reverse field advance

This VCR offers improved search functions with the ability to move both forwards and backwards between fields.

Real time display

The real time can be displayed even in time lapse mode.

Clock operation backup

When a power interruption occurs, the built-in rechargeable battery will provide backup power for the clock for up to 30 days.
Essential data, such as data setting, internal timer settings, recording time, and mode settings, and alarm recording mode settings are also retained.

Security lock

To guard against operation errors, this VCR locks all of the buttons.

Monitoring the recording condition

You can check the recorded image during recording by pressing a single button.

Checking the tape threading

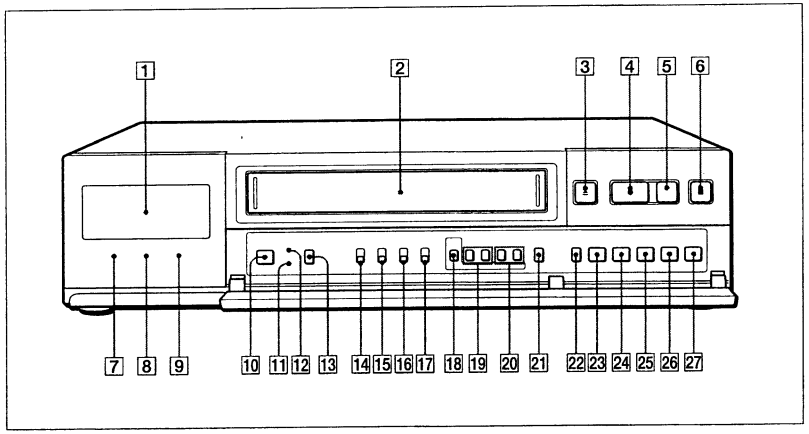
To ensure correct operation, the VCR automatically checks the tape threading whenever you insert a tape.

Other features

- Fast-forward and rewind with high speed
- Quick-start mechanism
- Power saving mode which turns off the display window
- The number of times of recording is recorded and displayed on the display window

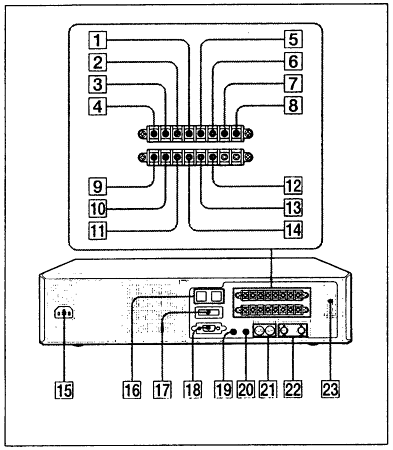
Location of Parts and Controls

Front Panel (Refer to pages in parentheses for details.)



1 Display window (7)
2 Cassette compartment
3 EJECT ⏏ button (17)
4 REC ● button
5 REC CHECK button (24)
6 STOP ■ button
7 ON indicator
8 SAVE indicator
9 REPEAT indicator (20)
10 STANDBY/ON switch
11 MENU RESET button (22)
12 CL (clear) button
To clear all the settings, press the button with pointed object. The settings will return to the initial setting.
13 TIMER button (27)
14 POWER SAVE switch
When the switch is set to ON, the indication in the display window goes off and the SAVE indicator lights up.
15 REAL TIME /COUNTER switch (19, 38)
16 REPEAT REC switch (20)
17 ON-SCREEN switch (15)
18 MENU button (12)
19 TRACKING –, + buttons (39)
MENU ▼, ▶ buttons (12)
20 REC/PLAY SPEED –, + buttons (19)
MENU –, + buttons (12)
21 COUNTER RESET button (38)
22 SEARCH/AUDIO ON button (12, 38)
23 REV ◀ button
24 REW ◀◀ button
25 PLAY ▶ button
26 FF ▶▶ button
27 PAUSE ❚❚ button

Rear Panel (Refer to pages in parentheses for details.)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1 TAPE END OUT terminal (44)
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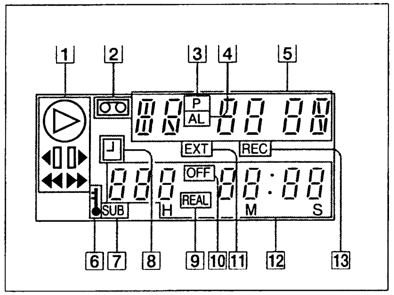
20 MIC IN jack (8)
21 AUDIO IN/OUT jacks (phono type)
22 VIDEO IN/OUT jacks (BNC type) (8)
23 Back-up battery compartment

Display Window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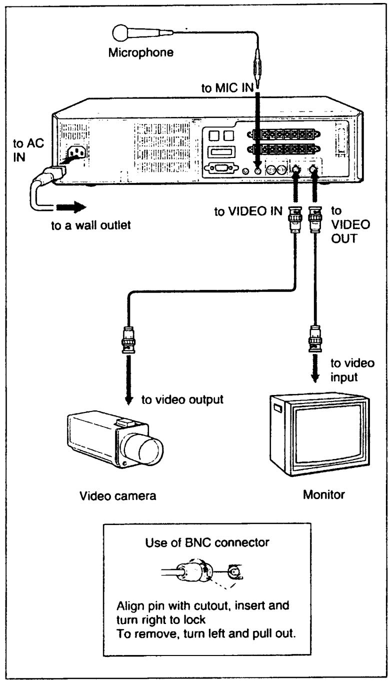
1 Tape operation indicators
2 Cassette indicator
3 Power interruption indicator
4 AL (alarm) indicator
5 Tape speed/Alarm search mode/Alarm scan mode/
Time/date search mode/Tape used count/Moisture
condensation
6 Security lock indicator
7 SUB-head indicator
8 Timer recording standby indicator
9 REAL indicator
10 OFF indicator
11 External timer indicator
12 Linear time counter/Timer recording indicator
13 REC indicator for Tape used count/Alarm data list

Connections

Turn all the power off before making connections.
Connect the AC power cord last.

Connecting a Camera, Monitor and Microphone

With the following connections, you can monitor the picture and sound.

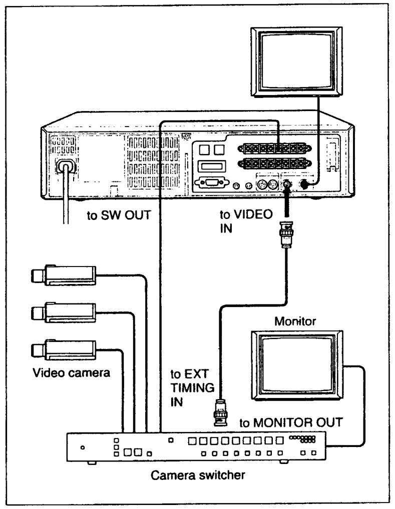

Microphone
to MIC IN
to AC IN
to a wall outlet
to VIDEO IN
to VIDEO OUT
to video output
to video input
Video camera
Monitor
Use of BNC connector

Align pin with cutout, insert and turn right to lock
To remove, turn left and pull out.

To connect an alarm sensor

Refer to page 32.

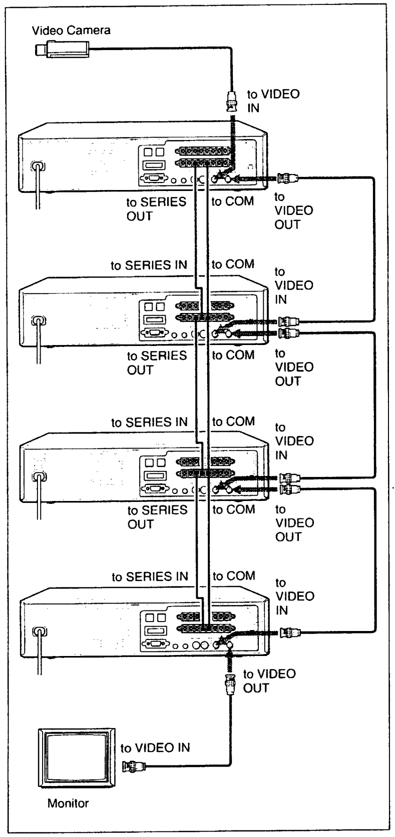
Connecting a Switcher


to SW OUT
to VIDEO IN
Monitor
Video camera
to EXT TIMING IN
to MONITOR OUT
Camera switcher

Note

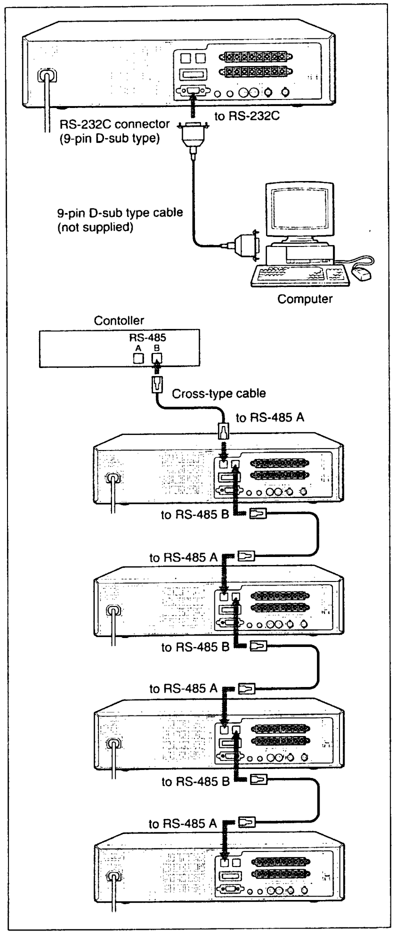
When you connect several cameras to a switcher, synchronize the cameras.
If not, the picture will be disturbed.

Connecting Another Unit in Series


Video Camera
to VIDEO IN
to SERIES OUT
to COM
to VIDEO OUT
to SERIES IN
to COM
to VIDEO IN
to SERIES OUT
to COM
to VIDEO OUT
to SERIES IN
to COM
to VIDEO IN
to SERIES OUT
to COM
to VIDEO OUT
to SERIES IN
to COM
to VIDEO IN
to VIDEO OUT
to VIDEO IN
Monitor

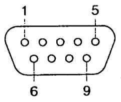
For operation, refer to page 21.

Connecting a Computer


RS-232C connector
(9-pin D-sub type)
to RS-232C
9-pin D-sub type cable
(not supplied)
Computer
Contoller
RS-485
A B
Cross-type cable
to RS-485 A
to RS-485 B
to RS-485 A
to RS-485 B
to RS-485 A
to RS-485 B
to RS-485 A

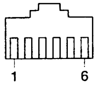
Pin assignment

RS-232C connector (D-sub 9-pin, female)

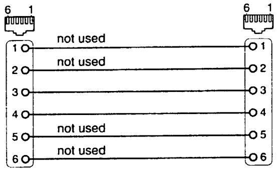


Pin No.	Signal	Operation	Signal Direction
2	RXD	Receive data	VCR ← Computer
3	TXD	Send data	VCR → Computer
7	RTS	Request to send	VCR → Computer
5	GND	Singnal ground	

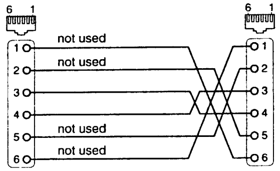
RS-485 connector (RJ-11)



Pin No.	A terminal signal	B terminal signal
1	Not used	Not used
2	Not used	Not used
3	A signal	B signal
4	B signal	A signal
5	Not used	Not used
6	Not used	Not used


6 1
6 1
not used
not used
not used
not used
1 2 3 4 5 6
1 2 3 4 5 6

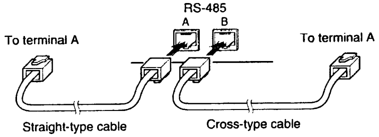
Straight type


6 1
6 1
not used
not used
not used
not used
1 2 3 4 5 6
1 2 3 4 5 6

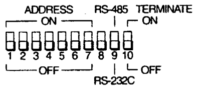
Cross type

Make the connection to the RS-485 control terminal using a modular cable (not supplied).

- If using a straight type cable, connect it between the A terminals, or between the B terminals (see illustration below).
- If using a crossed type cable, connect it from the A terminal to the B terminal, or from the B terminal to the A terminal (see illustration below).


RS-485
A B
To terminal A
To terminal A
Straight-type cable
Cross-type cable

ADDRESS
RS-485/RS-232C selector
RS-485 TERMINATE switches
(DIP switches)


ADDRESS
ON
OFF
RS-485
RS-232C
TERMINATE
ON
OFF
1 2 3 4 5 6 7 8 9 10

Switch No.	Operation
1 - 7	Set address (1 is lowest bit and 7 is highest) (ON:1, OFF:0) 7 is effective when using RS-485 connector
8	Not used
9	Select RS-485 or RS-232C
10	Terminate on/off when using RS-485 connector

RS-232C/RS-485 Interface

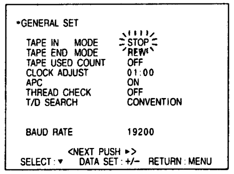
When the personal computer is connected to the RS-232C or RS-485 connector, the transmission speed (baud rate) can only be set using the GENERAL SET menu.

1 Select the RS-232C or RS-485 connector to be used using the RS-485/RS-232C switch at the rear.

2 Turn on the power of the equipment to be used.

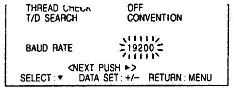
3 Press MENU and MENU ▼ until “4” of the MAIN MENU flashes on the monitor screen.

4 Press MENU ▶.
The GENERAL SET menu appears.



```
*GENERAL SET

  TAPE IN    MODE       STOP
  TAPE END  MODE        REW
  TAPE USED COUNT       OFF
  CLOCK ADJUST          01:00
  APC                   ON
  THREAD CHECK          OFF
  T/D SEARCH            CONVENTION


  BAUD RATE             19200

           <NEXT PUSH ▸>
 SELECT : ▾    DATA SET : +/-   RETURN : MENU
```

5 Press MENU ▼ to move the flashing to BAUD RATE and set the baud rate (19200, 2400, 4800 or 9600 bps) by pressing MENU + or –.

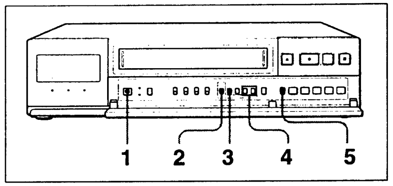


```
  THREAD CHECK          OFF
  T/D SEARCH            CONVENTION


  BAUD RATE             19200

           <NEXT PUSH ▸>
 SELECT : ▾    DATA SET : +/-   RETURN : MENU
```

6 Press SEARCH to return to the normal display.

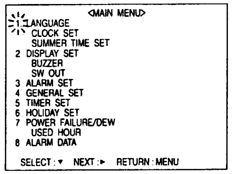
Setting the Language

Select either English, French or German for the display language.



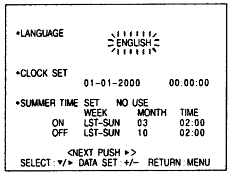
1 Turn on the power of the equipment to be used.

2 Press MENU.
The MAIN MENU appears on the monitor screen and “1” flashes.



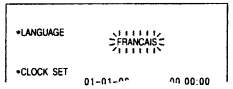
```
                    <MAIN MENU>
1 LANGUAGE
   CLOCK SET
   SUMMER TIME SET
2 DISPLAY SET
   BUZZER
   SW OUT
3 ALARM SET
4 GENERAL SET
5 TIMER SET
6 HOLIDAY SET
7 POWER FAILURE/DEW
   USED HOUR
8 ALARM DATA

  SELECT : ▾   NEXT : ▸   RETURN : MENU
```

3 Press MENU ▶.
The LANGUAGE/CLOCK SET/SUMMER TIME SET menu appears.



```
*LANGUAGE
                    ENGLISH


*CLOCK SET
             01-01-2000      00:00:00

*SUMMER TIME SET     NO USE
             WEEK       MONTH    TIME
       ON    LST-SUN    03       02:00
       OFF   LST-SUN    10       02:00

          <NEXT PUSH ▸>
 SELECT : ▾/▸ DATA SET : +/-   RETURN : MENU
```

4 Press MENU + or – to select the language.



```
*LANGUAGE
                      FRANCAIS


*CLOCK SET
             01-01-            00:00
```

5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu
Press MENU again.

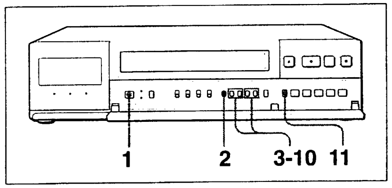
To go to the next menu from the current menu
Press MENU ▼ until “NEXT PUSH ▶” flashes and press MENU ▶.

Note

When you want to change the language again, repeat steps 2 to 5 after step 5.

Setting the Clock

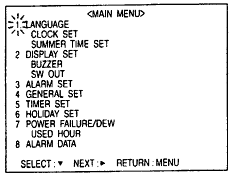
Set the clock to the current time and date on the monitor screen. To adjust to Summer Time, proceed the steps in "Adjusting to Summer Time" on page 14 first.



Example:
Set the date and time to 15:20 on 15 June, 2000.

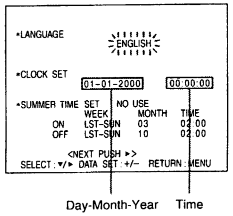
1 Turn on the power of the equipment to be used.

2 Press MENU.
The MAIN MENU appears on the monitor screen and "1" flashes.



```
              <MAIN MENU>
1 LANGUAGE
   CLOCK SET
   SUMMER TIME SET
2 DISPLAY SET
   BUZZER
   SW OUT
3 ALARM SET
4 GENERAL SET
5 TIMER SET
6 HOLIDAY SET
7 POWER FAILURE/DEW
   USED HOUR
8 ALARM DATA

 SELECT : ▼   NEXT : ▶   RETURN : MENU
```

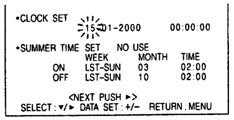
3 Press MENU ▶.
The LANGUAGE/CLOCK SET/SUMMER TIME SET menu appears.
The first display shows 1 January, 2000.



```
*LANGUAGE              ENGLISH

*CLOCK SET
                 01-01-2000       00:00:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

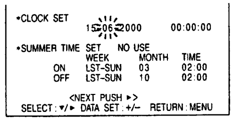
4 Press MENU ▼ to move the flashing to 01.

5 Set the day by pressing MENU + or –, then press MENU ▶.



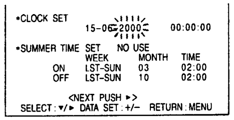
```
*CLOCK SET
              15-01-2000       00:00:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

6 Set the month by pressing MENU + or –, then press MENU ▶.



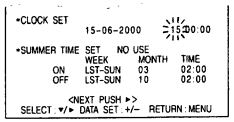
```
*CLOCK SET
              15-06-2000       00:00:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

7 Set the year by pressing MENU + or –, then press MENU ▶.



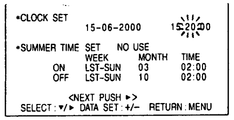
```
*CLOCK SET
              15-06-2000       00:00:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

8 Set the hour by pressing MENU + or –, then press MENU ▶.



```
*CLOCK SET
              15-06-2000       15:00:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

9 Set the minutes by pressing MENU + or –, then press MENU ▶.



```
*CLOCK SET
              15-06-2000       15:20:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

10 Press MENU – simultaneously with a time signal.
You can set the clock at the 00 second point.

11 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

Press MENU again.

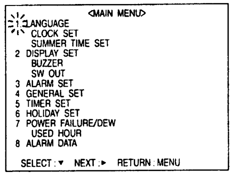
To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Adjusting to Summer Time

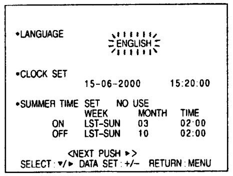
You can adjust to Summer Time when the season changes.

1 Press MENU.
The MAIN MENU appears on the monitor screen and "1" flashes.



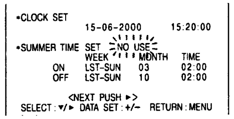
```
              <MAIN MENU>
1 LANGUAGE
   CLOCK SET
   SUMMER TIME SET
2 DISPLAY SET
   BUZZER
   SW OUT
3 ALARM SET
4 GENERAL SET
5 TIMER SET
6 HOLIDAY SET
7 POWER FAILURE/DEW
   USED HOUR
8 ALARM DATA

 SELECT : ▼   NEXT : ▶   RETURN : MENU
```

2 Press MENU ▶.
The LANGUAGE/CLOCK SET/SUMMER TIME SET menu appears.



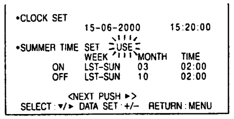
```
*LANGUAGE              ENGLISH

*CLOCK SET
                 15-06-2000       15:20:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

3 Press MENU ▼ to move the flashing to the setting of SUMMER TIME SET.



```
*CLOCK SET
              15-06-2000       15:20:00

*SUMMER TIME  SET     NO USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

4 Press MENU + or – to set SUMMER TIME SET to NO USE or USE.



```
*CLOCK SET
              15-06-2000       15:20:00

*SUMMER TIME  SET     USE
              WEEK          MONTH    TIME
        ON    LST-SUN       03       02:00
        OFF   LST-SUN       10       02:00

           <NEXT PUSH ▶>
 SELECT : ▼/▶ DATA SET : +/-   RETURN : MENU
```

NO USE: no Summer Time adjustment is made
USE: Summer Time adjustment is made

5 Press MENU ▼ and set the date and time the Summer Time adjustment is made.

WEEK ON
Press MENU + or – to set which day the Summer Time adjustment is made:
1ST, 2ND, 3RD, 4TH or LST for first, second, third, fourth or last week.
Then press MENU ▶, and press MENU + or – to select the day of the week:
SUN, MON, TUE, WED, THU, FRI or SAT.

MONTH ON
Press MENU ▶, and MENU + or – to set which month the Summer Time adjustment is made:
01, 02, 03, 04...11, 12 for January, February .....December.

TIME ON
Press MENU ▶, and MENU + or – to set the time the Summer Time adjustment is made. The time can only be set between 01 and 22.
Then press MENU ▶, and press MENU + or – to set the minutes.

Following the same procedures as WEEK ON, MONTH ON and TIME ON, set **WEEK OFF, MONTH OFF** and **TIME OFF** when the time is changed back from the Summer Time to standard time.

6 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

Press MENU again.

To go to the next menu from the current menu

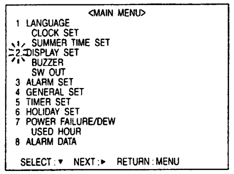
Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Setting the Time/Date Display

You can display five items of information (date, time, recording/playback speed, number of alarm recordings and warning display) and turn off each item which you do not want to display.

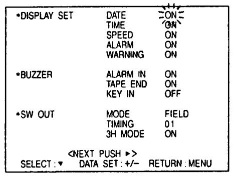
1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "2" of the MAIN MENU flashes on the monitor screen.



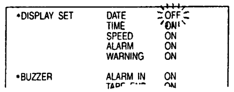
```
          <MAIN MENU>
 1 LANGUAGE
    CLOCK SET
    SUMMER TIME SET
 2 DISPLAY SET
    BUZZER
    SW OUT
 3 ALARM SET
 4 GENERAL SET
 5 TIMER SET
 6 HOLIDAY SET
 7 POWER FAILURE/DEW
    USED HOUR
 8 ALARM DATA

  SELECT:▼  NEXT:▶  RETURN:MENU
```

3 Press MENU ▶.
The DISPLAY SET/BUZZER/SW OUT menu appears.



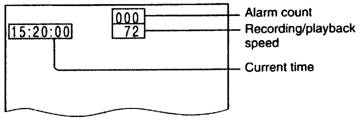
```
•DISPLAY SET        DATE       ON
                    TIME       ON
                    SPEED      ON
                    ALARM      ON
                    WARNING    ON

•BUZZER             ALARM IN   ON
                    TAPE END   ON
                    KEY IN     OFF

•SW OUT             MODE       FIELD
                    TIMING     01
                    3H MODE    ON

           <NEXT PUSH ▶>
 SELECT:▼   DATA SET:+/-   RETURN:MENU
```

4 Press MENU ▼ to move the flashing to the setting of each DATE, TIME, SPEED, ALARM and WARNING, and set to ON or OFF by pressing MENU + or –.
Example: When you set the date display to OFF.



```
•DISPLAY SET        DATE       OFF
                    TIME       ON
                    SPEED      ON
                    ALARM      ON
                    WARNING    ON

•BUZZER             ALARM IN   ON
```

5 Press SEARCH to return to the normal display.



To return to the MAIN MENU screen from the current menu
Press MENU again.

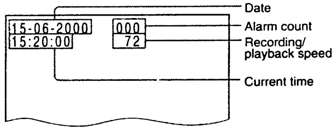
To go to the next menu from the current menu
Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

To turn off the screen display
Set the ON-SCREEN switch to OFF.

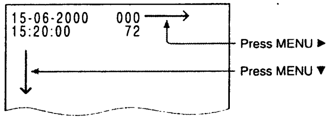
Changing the Display Position of the Time/Date Display

You can change the position of the time/date display that appears on the monitor screen.

1 Turn on the power of the equipment to be used.
The normal display appears.



2 Change the display position as follows.
To move the display downwards, press MENU ▼. (When the display reaches the bottom of the screen, the display returns to the top of the screen.)
To move the display rightwards, press MENU ▶. (When the display reaches the right-hand edge of the screen, the display returns to the left-hand edge of the screen.)



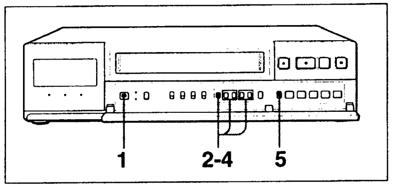
Note

While recording, this function does not work.

Setting the Buzzers

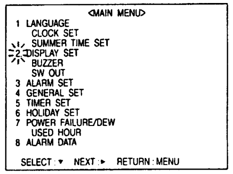
You can turn on/off three types of buzzers:

- **ALARM IN buzzer:** beeps while it receives an alarm signal. (See "Alarm Recording" for more information on page 32.)
- **TAPE END buzzer:** beeps when the tape reaches its end.
- **KEY IN buzzer:** beeps when you press a button.



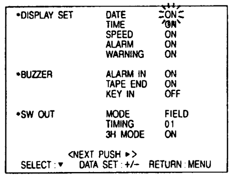
1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "2" of the MAIN MENU flashes on the monitor screen.



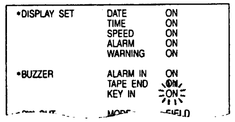
```
          <MAIN MENU>
 1 LANGUAGE
    CLOCK SET
    SUMMER TIME SET
 2 DISPLAY SET
    BUZZER
    SW OUT
 3 ALARM SET
 4 GENERAL SET
 5 TIMER SET
 6 HOLIDAY SET
 7 POWER FAILURE/DEW
    USED HOUR
 8 ALARM DATA

  SELECT:▼  NEXT:▶  RETURN:MENU
```

3 Press MENU ▶.
The DISPLAY SET/BUZZER/SW OUT menu appears.



```
•DISPLAY SET        DATE       ON
                    TIME       ON
                    SPEED      ON
                    ALARM      ON
                    WARNING    ON

•BUZZER             ALARM IN   ON
                    TAPE END   ON
                    KEY IN     OFF

•SW OUT             MODE       FIELD
                    TIMING     01
                    3H MODE    ON

           <NEXT PUSH ▶>
 SELECT:▼   DATA SET:+/-   RETURN:MENU
```

4 Press MENU ▼ to move the flashing to the setting of each ALARM IN, TAPE END and KEY IN, and set to ON or OFF by pressing MENU + or –.



```
•DISPLAY SET        DATE       ON
                    TIME       ON
                    SPEED      ON
                    ALARM      ON
                    WARNING    ON

•BUZZER             ALARM IN   ON
                    TAPE END   ON
                    KEY IN     ON
```

5 Press SEARCH to return to the normal display.

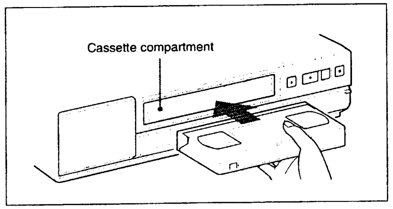
To return to the MAIN MENU screen from the current menu
Press MENU again.

To go to the next menu from the current menu
Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Handling a Video Cassette

This section shows you how to insert a video cassette into the VCR.

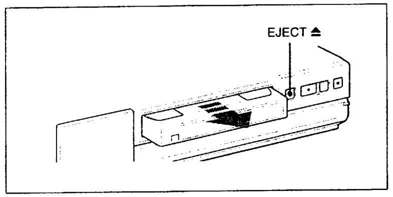
Inserting a Video Cassette



Insert the cassette into the cassette compartment by slowly pressing its center with the arrow on the top. When the cassette is inserted, the VCR automatically turns on and the ▭ indicator lights in the display window.

If you insert the cassette without its safety tab for recording, the VCR ejects the cassette automatically.

Ejecting a Video Cassette



To eject the cassette, press EJECT ⏏ on the VCR.

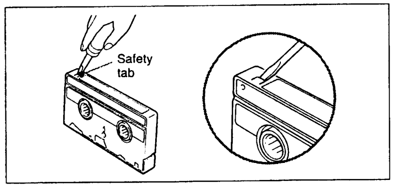
You can eject the cassette even when the power is off.

When you press EJECT ⏏, the VCR turns on automatically.

After ejecting the cassette, the VCR turns off again.

Protecting Your Cassette from Being Erased

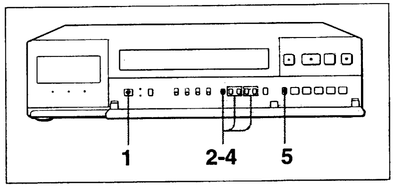
Remove the tab on the cassette with a screwdriver or a similar tool as shown below. This protects your cassette against an accidental recording.



If you want to record again on the cassette without its safety tab, simply cover the safety tab hole with a piece of plastic tape.

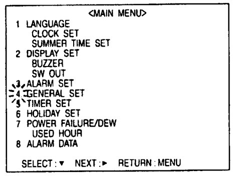
Setting the Operation Mode

You can set the mode for the VCR when a video cassette is inserted on the GENERAL SET menu.



1 Turn on the power of the equipment to be used.

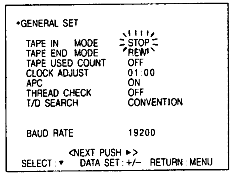
2 Press MENU and MENU ▼ until “4” of the MAIN MENU flashes on the monitor screen.



```
<MAIN MENU>
1 LANGUAGE
   CLOCK SET
   SUMMER TIME SET
2 DISPLAY SET
   BUZZER
   SW OUT
3 ALARM SET
4 GENERAL SET
5 TIMER SET
6 HOLIDAY SET
7 POWER FAILURE/DEW
   USED HOUR
8 ALARM DATA

 SELECT:▼  NEXT:►  RETURN:MENU
```

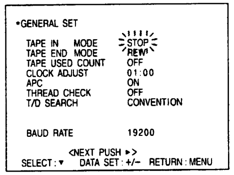
3 Press MENU ►.

The GENERAL SET menu appears.



```
*GENERAL SET

  TAPE IN   MODE       STOP
  TAPE END  MODE       REW
  TAPE USED COUNT      OFF
  CLOCK ADJUST         01:00
  APC                  ON
  THREAD CHECK         OFF
  T/D SEARCH           CONVENTION


  BAUD RATE            19200

          <NEXT PUSH ►>
 SELECT:▼    DATA SET:+/-  RETURN:MENU
```

4 Press MENU ▼ to move the flashing to the setting of TAPE IN MODE and set STOP or REC by pressing MENU + or –.



```
*GENERAL SET

  TAPE IN   MODE       STOP
  TAPE END  MODE       REW
  TAPE USED COUNT      OFF
  CLOCK ADJUST         01:00
  APC                  ON
  THREAD CHECK         OFF
  T/D SEARCH           CONVENTION


  BAUD RATE            19200

          <NEXT PUSH ►>
 SELECT:▼    DATA SET:+/-  RETURN:MENU
```

STOP: the VCR enters stop mode when a video cassette is inserted.

REC: the VCR enters recording mode when a video cassette is inserted.

5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

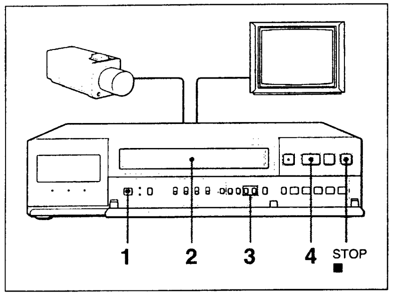
Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until “NEXT PUSH ►” flashes and press MENU ►.

Recording

This section shows you how to record the signal from the video camera in the normal or time lapse mode, to set the security lock and to record repeatedly on the same cassette.



1 Turn on the power of the equipment to be used.

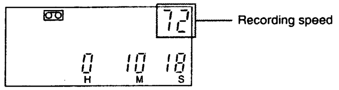
2 Insert the cassette.

3 Set the recording speed by pressing REC/PLAY SPEED + or –.

Recording speed	Maximum recording time with 180-minute tape		Interval	Audio recording	Tape motion
3	Standard mode	3	1/50	Possible	Continuous
12	Time lapse mode	15	0.1		
24		27	0.18		
48		51	0.34	No	Intermittent
72		75	0.5		

Note

In time lapse mode, it is possible to record additionally 3 hours longer than the displayed recording time.



In the display window

4 Press REC ●.
Recording starts.

To stop recording

Press STOP ■.

If recording does not start and the cassette is ejected

The tab on the cassette is removed to protect against accidental recording.

Displaying the real time (in recording or stop mode only)

Set the REAL TIME/COUNTER switch to REAL TIME. The real time will be displayed in the display window. In playback mode, the display shows the tape counter regardless of the switch position.

Notes

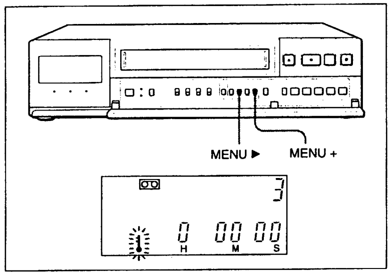
- Whenever you insert a tape and first start recording, Adaptive Picture Control (APC) automatically improves recording quality by adjusting the VCR to the condition of the video heads and tape. To activate this function, set APC in the GENERAL SET menu to ON (see page 39). There is about a 6-second delay before the VCR actually starts recording when REC ● is pressed.
- This VCR is provided with a clog detection function. In time lapse mode, if recording is not made properly, the recording indicator will flash on the display window and a warning signal will be output from the WARNING OUT terminal. In this case, stop recording immediately and check the VCR.
- If ALARM DATA REC in the ALARM SET menu and/or TAPE USED COUNT in the GENERAL SET menu is set to ON, the VCR will rewind the tape and recording will start from the beginning of the tape. While the VCR is rewinding the tape, "<ALARM DATA REC>" and/or "<TAPE USED COUNT>" flashes on the monitor screen.
- While both TAPE USED COUNT and ALARM DATA list are being recorded, the REC indicator in the display window goes out momentarily.

Locking the Record Mode — Security Lock Function

Locking the record mode is useful to guard against accidental recording interruptions when the VCR is used for surveillance or monitoring purposes.

To set the security lock

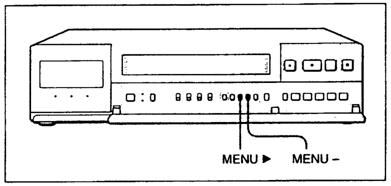
While pressing MENU ▶, press MENU +.
The ⫶ indicator lights in the display window.



The security lock function also works in timer recording and playback modes.

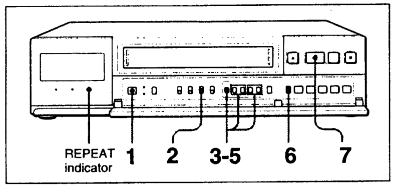
To release the security lock

While pressing MENU ▶, press MENU –.
The ⫶ indicator turns off.



Recording on the Same Cassette Repeatedly — Repeat Recording

You can record on the same cassette repeatedly in two different modes: REPEAT 1 and REPEAT 2.



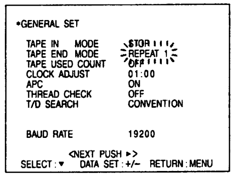
1 Turn on the power of the equipment to be used.

2 Set REPEAT REC to ON.
The REPEAT indicator lights.

3 Press MENU and MENU ▼ until "4" of the MAIN MENU flashes on the monitor screen.

4 Press MENU ▶.
The GENERAL SET menu appears.

5 Press MENU ▼ to move the flashing to the setting of TAPE END MODE and set to REPEAT 1 or REPEAT 2 by pressing MENU + or –.



```
*GENERAL SET

 TAPE IN   MODE      STOP
 TAPE END  MODE      REPEAT 1
 TAPE USED COUNT     OFF
 CLOCK ADJUST        01:00
 APC                 ON
 THREAD CHECK        OFF
 T/D SEARCH          CONVENTION


 BAUD RATE           19200

          <NEXT PUSH ▶>
SELECT:▼   DATA SET:+/-   RETURN:MENU
```

REPEAT 1: If an alarm input is received during repeat recording, the recording mode switches to alarm recording. After the end of the tape is reached, the tape is automatically rewound and stops at the beginning. The OFF indicator lights in the display window.

REPEAT 2: If an alarm input is received during repeat recording, the recording mode switches to alarm recording. Repeat recording is performed regardless of whether an alarm input is received or not.

6 Press SEARCH to return to the normal display.

7 Press REC ●.
Recording begins.

Note

If the REPEAT REC switch is set to OFF while repeat recording is in progress, recording proceeds until the end of the tape is reached and then stops automatically after the tape is rewound to the beginning. The OFF indicator lights in the display window.

To return to the MAIN MENU screen from the current menu

Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Series Recording

Connect another SVT-72P for series recording (for details on connection, see page 9) and set each of the units as follows.

Item	Unit #1	Unit #2	Unit #3 and subsequent unit
SERIES REC on ALARM SET menu	ON	ON	ON
TAPE END WARN. on ALARM SET menu	COUNTER	COUNTER	COUNTER
Cassette tape	Loaded	Loaded	Loaded
Operating status	Recording	Turned off	Turned off
REPEAT REC	OFF	OFF	OFF
Security lock	Locked	Locked	Locked
Timer recording	Deactivated	Deactivated	Deactivated

When all of the settings are complete, set unit #1 in recording mode and turn off the power of unit #2 and subsequent unit.
When recording on unit #1 is complete, the power for unit #2 turn on and recording begins (The recording cannot be done for about 11 seconds.).
The unit #1 rewinds its tape and turns off.

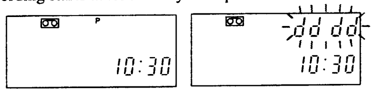
When a E-180 tape is used and TAPE END WARN. is set to COUNTER, the unit #2 starts recording before the unit #1 stops so that recording is continued without stop.

Note

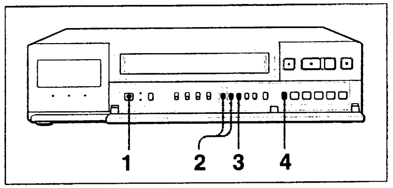
For series recording, set SERIES REC in the ALARM SET menu to ON. If it is set to OFF, recording cannot be done even if a signal is input to the SERIES IN terminal.

Recording after Power Interruption or Moisture Condensation

If a power interruption occurs, the P indicator lights in the display window and if a moisture condensation occurs, the "dddd" indicator flashes. Even if a power interruption or moisture condensation occurs while recording, the internal batteries provide backup power for memory for at least 30 days. The internal batteries can be charged in about 48 hours.
If the power is interrupted during recording, the recording starts automatically after power is restored.



To check power interruptions or moisture condensation



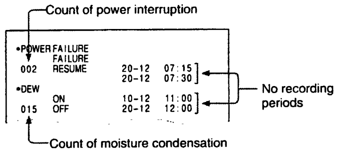
1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "7" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The POWER FAILURE/DEW/USED HOUR menu appears.

4 Press SEARCH to return to the normal display.

This shows a count of the power interruption and moisture condensation and the period when the recording was interrupted.



```
•POWER FAILURE
          FAILURE
 002      RESUME          20-12    07:15
                          20-12    07:30
•DEW
          ON              10-12    11:00
 015      OFF             20-12    12:00
```

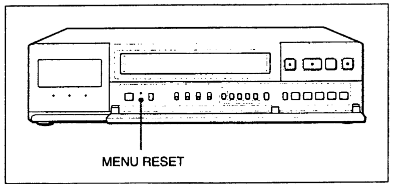
To return to the MAIN MENU screen from the current menu

Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

To clear the P indicator



Press MENU RESET.

To clear the power interruption/moisture condensation data

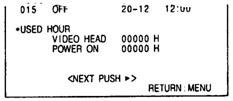
Press MENU and MENU ▼/▶ until the POWER FAILURE/DEW/USED HOUR menu appears and press MENU RESET with pointed object.

Checking the Used Time

1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "7" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The POWER FAILURE/DEW/USED HOUR menu appears.



```
 015   OFF              20-12   12:00

•USED HOUR
      VIDEO HEAD     00000 H
      POWER ON       00000 H

         <NEXT PUSH ▸>
                            RETURN : MENU
```

VIDEO HEAD: the amount of time the video head has been used.

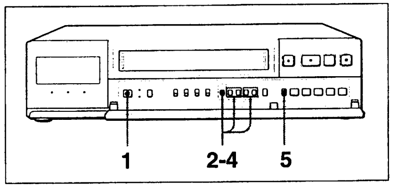
POWER ON: the amount of time the power has been on.

4 Press SEARCH to return to the normal display.

Setting the Mode at the End of the Tape

You can set the mode of the tape operation when the tape comes to the end during recording in the GENERAL SET menu.

When the REPEAT REC switch is set to OFF

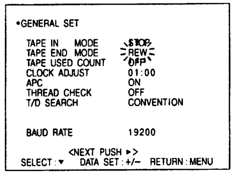


1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "4" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The GENERAL SET menu appears.

4 Press MENU ▼ to move the flashing to the setting of TAPE END MODE and set to REW or STOP by pressing MENU + or –.



```
•GENERAL SET

  TAPE IN    MODE       STOP
  TAPE END   MODE       REW
  TAPE USED COUNT       OFF
  CLOCK ADJUST          01:00
  APC                   ON
  THREAD CHECK          OFF
  T/D SEARCH            CONVENTION


  BAUD RATE             19200

          <NEXT PUSH ▸>
 SELECT : ▾   DATA SET : +/–   RETURN : MENU
```

REW: when the tape comes to the end, the VCR rewinds the tape automatically and enters stop mode at the beginning of the tape.

STOP: when the tape comes to the end, the VCR enters stop mode at once.

5 Press SEARCH to return to the normal display.

Note

Even if TAPE END MODE is set to STOP, the VCR operates according to the settings of ALARM DATA REC and/or TAPE USED COUNT if those settings are set to ON.

When the tape reaches the end

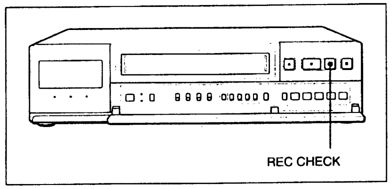
The OFF indicator lights in the display window. Press EJECT ⏏, REC ●, FF ▶▶, REW ◀◀ or PLAY ▶ to turn off the OFF indicator.

When the REPEAT REC switch is set to ON

Follows the steps 2 through 6 in "Recording on the Same Cassette Repeatedly — Repeat Recording" on page 20.

Monitoring the Recording Condition

You can check the recording condition by pressing REC CHECK while recording in time lapse mode.



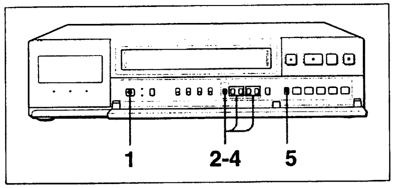
Press REC CHECK while recording.
After the tape is rewound for about three seconds and played back for about two seconds, the unit returns to the original recording mode.

Note

While monitoring the recording condition, recording is interrupted.

Checking the tape thread

To ensure correct operation, the VCR automatically checks the tape threading whenever you insert a tape, and it takes about 5 seconds. If an error is detected, the VCR ejects the tape.
If you consider it necessary to check the tape threading, you can set it in the GENERAL SET menu.

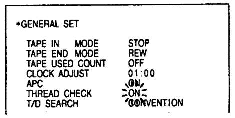


1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "4" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The GENERAL SET menu appears.

4 Press MENU ▼ to move the flashing to the setting of THREAD CHECK and set to ON to activate the thread check function by pressing MENU + or –.



```
•GENERAL SET

  TAPE IN    MODE       STOP
  TAPE END   MODE       REW
  TAPE USED COUNT       OFF
  CLOCK ADJUST          01:00
  APC                   ON
  THREAD CHECK          ON
  T/D SEARCH            CONVENTION
```

5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

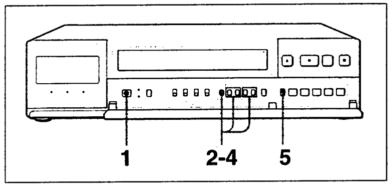
Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Checking the Number of Times the Tape Was Used

You can check how many times the tape has been used in the GENERAL SET menu. The number of times will be displayed on the display window. The number of times is recorded on the beginning of the tape.

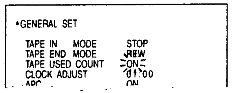


1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "4" of the MAIN MENU flashes on the monitor screen.

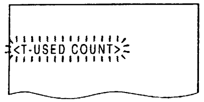
3 Press MENU ▶.
The GENERAL SET menu appears.

4 Press MENU ▼ to move the flashing to the setting of TAPE USED COUNT and set to ON by pressing MENU + or –.



```
*GENERAL SET

  TAPE IN   MODE        STOP
  TAPE END  MODE        REW
  TAPE USED COUNT       ON
  CLOCK ADJUST          01:00
  ABC                   ON
```

ON: when the tape is inserted, the VCR automatically rewinds the tape and the number of times the tape was used will appear on the display window. While the VCR is rewinding the tape, "<T-USED COUNT>" flashes on the monitor screen.



```
<T-USED COUNT>
```

OFF: the VCR starts recording from the point the tape is at when it is inserted.

5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Note

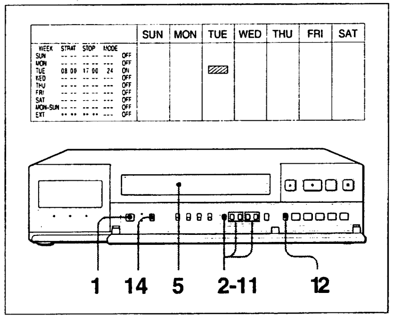
While recording of the TAPE USED COUNT is in progress, the REC indicator lights in the display window.

Timer Recording

You can set the timer recording to either: day-of-the-week recording or daily recording.
Before starting, make sure that the time and date are set properly. (See page 13.)
The setting of each line of WEEK except EXT (the lowest line) changes as follows using MENU +:
SUN → MON → TUE → WED → THU → FRI → SAT → MON-SUN → MON-SAT → MON-FRI → SUN....

Day-of-the-Week Recording

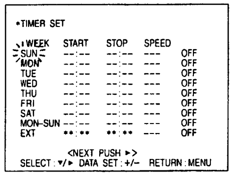
Example 1:
Making a recording from 8:00 on Tuesday to 17:00 the same day with the recording speed set to 24-hour mode.



1 Turn on the power of the equipment to be used.

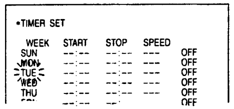
2 Press MENU and MENU ▼ until "5" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The TIMER SET menu appears.



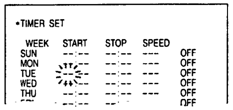
```
*TIMER SET

 WEEK     START   STOP    SPEED
 SUN      --:--   --:--   ---     OFF
 MON      --:--   --:--   ---     OFF
 TUE      --:--   --:--   ---     OFF
 WED      --:--   --:--   ---     OFF
 THU      --:--   --:--   ---     OFF
 FRI      --:--   --:--   ---     OFF
 SAT      --:--   --:--   ---     OFF
 MON-SUN  --:--   --:--   ---     OFF
 EXT      **:**   **:**   ---     OFF

          <NEXT PUSH ▶>
 SELECT : ▼/▶  DATA SET : +/-   RETURN : MENU
```

4 Press MENU ▼ to move the flashing to the line of WEEK you want and set TUE by pressing MENU + or –.



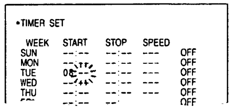
```
*TIMER SET

 WEEK   START   STOP    SPEED
 SUN    --:--   --:--   ---     OFF
 MON    --:--   --:--   ---     OFF
 TUE    --:--   --:--   ---     OFF
 WED    --:--   --:--   ---     OFF
 THU    --:--   --:--   ---     OFF
```

5 Press MENU ▶ to move the flashing to the hour position of START.



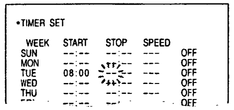
```
*TIMER SET

 WEEK   START   STOP    SPEED
 SUN    --:--   --:--   ---     OFF
 MON    --:--   --:--   ---     OFF
 TUE    --:--   --:--   ---     OFF
 WED    --:--   --:--   ---     OFF
 THU    --:--   --:--   ---     OFF
```

6 Set the start hour by pressing MENU + or – and press MENU ▶.



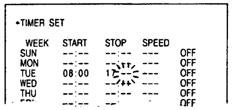
```
*TIMER SET

 WEEK   START   STOP    SPEED
 SUN    --:--   --:--   ---     OFF
 MON    --:--   --:--   ---     OFF
 TUE    08:--   --:--   ---     OFF
 WED    --:--   --:--   ---     OFF
 THU    --:--   --:--   ---     OFF
```

7 Set the start minute by pressing MENU + or – and press MENU ▶.



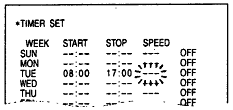
```
*TIMER SET

 WEEK   START   STOP    SPEED
 SUN    --:--   --:--   ---     OFF
 MON    --:--   --:--   ---     OFF
 TUE    08:00   --:--   ---     OFF
 WED    --:--   --:--   ---     OFF
 THU    --:--   --:--   ---     OFF
```

8 Set the stop hour by pressing MENU + or – and press MENU ▶.



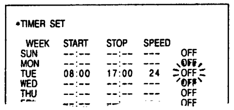
```
*TIMER SET

 WEEK   START   STOP    SPEED
 SUN    --:--   --:--   ---     OFF
 MON    --:--   --:--   ---     OFF
 TUE    08:00   17:--   ---     OFF
 WED    --:--   --:--   ---     OFF
 THU    --:--   --:--   ---     OFF
```

9 Set the stop minute by pressing MENU + or – and press MENU ▶.



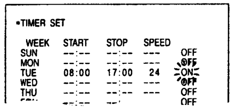
```
*TIMER SET

 WEEK   START   STOP    SPEED
SUN     --:--   --:--   ---     OFF
MON     --:--   --:--   ---     OFF
TUE     08:00   17:00   ---     OFF
WED     --:--   --:--   ---     OFF
THU     --:--   --:--   ---     OFF
                                OFF
```

10 Set the recording speed by pressing MENU + or – and press MENU ▶.



```
*TIMER SET

 WEEK   START   STOP    SPEED
SUN     --:--   --:--   ---     OFF
MON     --:--   --:--   ---     OFF
TUE     08:00   17:00    24     OFF
WED     --:--   --:--   ---     OFF
THU     --:--   --:--   ---     OFF
        --:--                   OFF
```

11 Select ON to execute the timer recording by pressing MENU + or –.



```
*TIMER SET

 WEEK   START   STOP    SPEED
SUN     --:--   --:--   ---     OFF
MON     --:--   --:--   ---     OFF
TUE     08:00   17:00    24     ON
WED     --:--   --:--   ---     OFF
THU     --:--   --:--   ---     OFF
        --:--                   OFF
```

If you want to preset other settings, repeat steps 4 to 11.

12 Press SEARCH to return to the normal display.

13 Insert the cassette.

14 Press TIMER.
The VCR turns off automatically, and enters the timer recording standby mode. The ⊡ indicator appears in the display window.
When no cassette is inserted, the ⊡ indicator flashes and a beep sounds.

When the ⊡ indicator appears in the display window, the buttons except TIMER does not work.

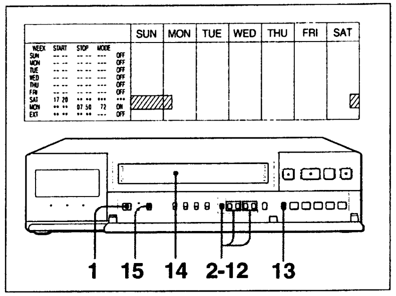
You can set the timer to make a recording for 2 days using the 7th and 8th lines on the TIMER SET display.

Example 2:

Making a recording from 17:20 on Saturday to 7:50 on Monday with the recording speed set to 72-hour mode.

Note

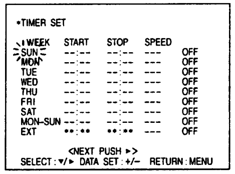
To make a recording for 2 days, use the 7th and 8th lines only.



1 Turn on the power of the equipment to be used.

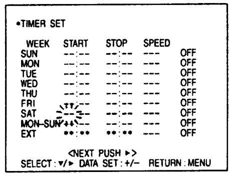
2 Press MENU and MENU ▼ until "5" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The TIMER SET menu appears.



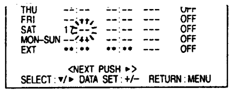
```
*TIMER SET

 WEEK     START   STOP    SPEED
SUN       --:--   --:--   ---     OFF
MON       --:--   --:--   ---     OFF
TUE       --:--   --:--   ---     OFF
WED       --:--   --:--   ---     OFF
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       --:--   --:--   ---     OFF
MON-SUN   --:--   --:--   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

4 Press MENU ▼ to move the flashing to the 7th line, set SAT by pressing MENU + or – and press MENU ▶.



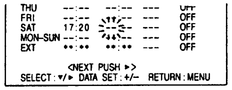
```
*TIMER SET

 WEEK     START   STOP    SPEED
SUN       --:--   --:--   ---     OFF
MON       --:--   --:--   ---     OFF
TUE       --:--   --:--   ---     OFF
WED       --:--   --:--   ---     OFF
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       --:--   --:--   ---     OFF
MON-SUN   --:--   --:--   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

5 Set the start hour by pressing MENU + or – and press MENU ▶.



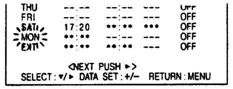
```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17--    --:--   ---     OFF
MON-SUN   --:--   --:--   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

6 Set the start minute by pressing MENU + or – and press MENU ▶.



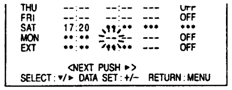
```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   --:--   ---     OFF
MON-SUN   --:--   --:--   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

7 The ∗ marks appear on the stop time (STOP), recording speed (SPEED) and timer execution positions in the 7th line and on the start time (START) position in the 8th line.
The day of the week in the 8th line changes to the day after the day in the 7th line.



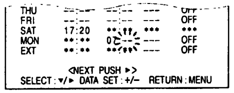
```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   **:**   ***     OFF
MON       **:**   --:--   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

8 Set flashing SUN to MON by pressing MENU + or – and press MENU ▶ to move the flashing to the hour position of STOP.



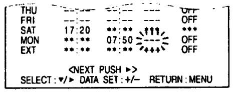
```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   **:**   ***     ***
MON       **:**   --:--   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

9 Set the stop hour by pressing MENU + or – and press MENU ▶.



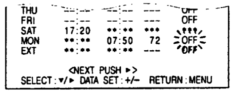
```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   **:**   ***     ***
MON       **:**   07--    ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

10 Set the stop minute by pressing MENU + or – and press MENU ▶.



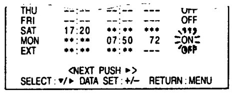
```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   **:**   ***     ***
MON       **:**   07:50   ---     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

11 Set the recording speed by pressing MENU + or – and press MENU ▶.



```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   **:**   ***     ***
MON       **:**   07:50    72     OFF
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

12 Select ON to execute the timer recording by pressing MENU + or –.



```
THU       --:--   --:--   ---     OFF
FRI       --:--   --:--   ---     OFF
SAT       17:20   **:**   ***     ***
MON       **:**   07:50    72     ON
EXT       **:**   **:**   ---     OFF

          <NEXT PUSH ▸>
SELECT : ▾/▸  DATA SET : +/–   RETURN : MENU
```

13 Press SEARCH to return to the normal display.

14 Insert the cassette.

15 Press TIMER.
The VCR turns off automatically, and enters the timer recording standby mode. The ⊡ indicator appears in the display window.
When no cassette is inserted. The ⊡ indicator flashes and a beep sounds.

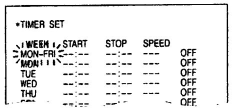
When the ⊡ indicator appears in the display window, the buttons except TIMER does not work.

Daily Recording

You can preset the timer to record Monday through Sunday (MON-SUN), Monday through Saturday (MON-SAT) or Monday through Friday (MON-FRI).

1 Press ▼ to move the flashing to the line of WEEK you want.

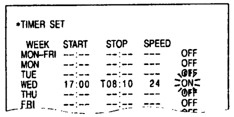
2 Set the day by pressing MENU + or – before setting the hour position of START in step 5.



```
•TIMER SET

 WEEK     START   STOP    SPEED
 MON-FRI  --:--   --:--   ---    OFF
 MON      --:--   --:--   ---    OFF
 TUE      --:--   --:--   ---    OFF
 WED      --:--   --:--   ---    OFF
 THU      --:--   --:--   ---    OFF
```

When the time set in the STOP section is earlier than the time set in the START section

The STOP time is assumed to be for the next day, and the T (tomorrow) indicator is displayed before the stop time.



```
•TIMER SET

 WEEK     START   STOP    SPEED
 MON-FRI  --:--   --:--   ---    OFF
 MON      --:--   --:--   ---    OFF
 TUE      --:--   --:--   ---    OFF
 WED      17:00   T08:10   24    ON
 THU      --:--   --:--   ---    OFF
 FRI      --:--   --:--   ---    OFF
```

Timer recording is interrupted when the power is interrupted

When a period of the power interruption is shorter than the power backup time (within 30 days) and within the timer end time, the recording is resumed after the power is restored.

The P indicator lights in the display window to show that the timer recording is interrupted. (To clear the P indicator, press MENU RESET on the front panel. See page 22.)

To stop the timer recording

Press TIMER to clear the ⌚ indicator. The recording stops and the power is turned off.

Recording Using an External Timer

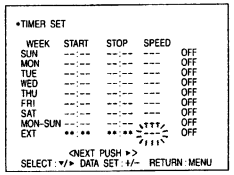
You can preset the time to start and end recording by using a timer connected to the EXT TIMER terminal on the rear of the VCR. Set the recording speed on the TIMER SET menu on screen.

1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "5" of the MAIN MENU flashes on the monitor screen.

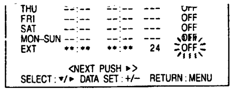
3 Press MENU ▶.
The TIMER SET menu appears.

4 Press MENU ▼ to move the flashing to SPEED of the lowest line (EXT) and press MENU ▶.



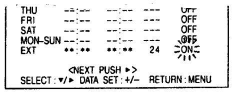
```
•TIMER SET

 WEEK     START   STOP    SPEED
 SUN      --:--   --:--   ---    OFF
 MON      --:--   --:--   ---    OFF
 TUE      --:--   --:--   ---    OFF
 WED      --:--   --:--   ---    OFF
 THU      --:--   --:--   ---    OFF
 FRI      --:--   --:--   ---    OFF
 SAT      --:--   --:--   ---    OFF
 MON-SUN  --:--   --:--   ---    OFF
 EXT      **:**   **:**   ---    OFF

          <NEXT PUSH ▸>
 SELECT : ▾/▸  DATA SET : +/-   RETURN : MENU
```

5 Set the recording speed by pressing MENU + or – and press MENU ▶.



```
 THU      --:--   --:--   ---    OFF
 FRI      --:--   --:--   ---    OFF
 SAT      --:--   --:--   ---    OFF
 MON-SUN  --:--   --:--   ---    OFF
 EXT      **:**   **:**    24    OFF

          <NEXT PUSH ▸>
 SELECT : ▾/▸  DATA SET : +/-   RETURN : MENU
```

6 Set ON to execute the timer recording by pressing MENU + or –.



```
 THU      --:--   --:--   ---    OFF
 FRI      --:--   --:--   ---    OFF
 SAT      --:--   --:--   ---    OFF
 MON-SUN  --:--   --:--   ---    OFF
 EXT      **:**   **:**    24    ON

          <NEXT PUSH ▸>
 SELECT : ▾/▸  DATA SET : +/-   RETURN : MENU
```

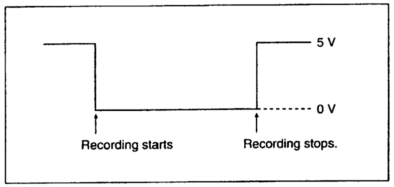
7 Press SEARCH to return to the normal display.

8 Insert the cassette.

9 Press TIMER.
The VCR turns off automatically, and enters the timer recording standby mode. The ⌚ indicator appears in the display window.
When no cassette is inserted, the ⌚ indicator flashes and a beep sounds.

When the input signal from the EXT TIMER terminal becomes low, recording starts and the EXT indicator appears in the display window.
When the input signal from the EXT TIMER terminal becomes high, recording stops and the VCR enters the timer recording standby mode.

Input signal from the EXT TIMER terminal



Note

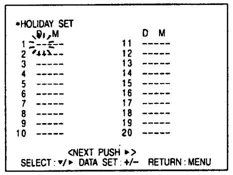
When more than one timer setting is made at the same time, the setting with the earliest START time has priority.

Setting the Holiday

If you enter dates for holidays, the VCR will assume that these dates are Sundays and will record at the same time you set for Sundays.

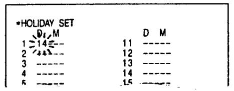
1 Press MENU and MENU ▼ until "6" of the MAIN MENU flashes on the monitor screen.

2 Press MENU ▶.
The HOLIDAY SET menu appears.



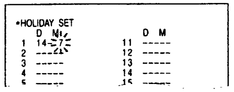
```
•HOLIDAY SET
     D  M                 D  M
 1  -----             11  -----
 2  -----             12  -----
 3  -----             13  -----
 4  -----             14  -----
 5  -----             15  -----
 6  -----             16  -----
 7  -----             17  -----
 8  -----             18  -----
 9  -----             19  -----
10  -----             20  -----

          <NEXT PUSH ▸>
 SELECT : ▾/▸  DATA SET : +/-   RETURN : MENU
```

3 Set the day of the holiday you want by pressing MENU + or – and press MENU ▶.



```
•HOLIDAY SET
     D  M                 D  M
 1  14---             11  -----
 2  -----             12  -----
 3  -----             13  -----
 4  -----             14  -----
```

4 Set the month of the holiday by pressing MENU + or –.



```
•HOLIDAY SET
     D  M                 D  M
 1  14- 7             11  -----
 2  -----             12  -----
 3  -----             13  -----
 4  -----             14  -----
```

To set other holidays, press MENU ▼ to move to the next row and repeat steps 2 and 3.

5 Press SEARCH to return to the normal display.

Changing/Cancelling the Timer Settings

When ◷ indicator lights in the display window, press TIMER again to clear it.

Changing the timer settings

1. Press MENU and MENU ▼ and ▶ until the TIMER SET menu appears on the screen.
2. Press MENU ▼ or ▶ to move the flashing to the position where you want to change.
3. Press MENU + or – to change the setting.
4. Press SEARCH to return to the normal display.

Cancelling the timer setting

1. Press MENU and MENU ▼ and ▶ until the TIMER SET menu appears on the screen.
2. Press MENU ▼ to move the flashing to the position where you want to cancel.
3. Press MENU ▶ to move the flashing to the timer execution.
4. Press MENU + or – to set the timer execution to OFF.
5. Press SEARCH to return to the normal display.

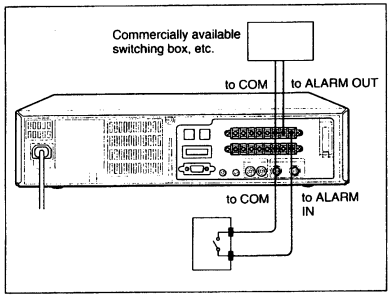
Cancelling all timer settings

1. Press MENU and MENU ▼ and ▶ until the TIMER SET menu appears on the screen.
2. Press MENU RESET.
   All timer settings are cleared.
3. Press SEARCH to return to the normal display.

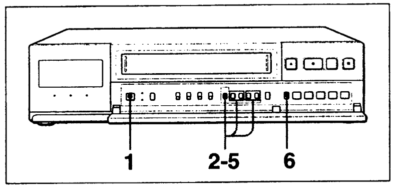
Alarm Recording

You can use a door switch or alarm sensor to trigger alarm recording. You can make alarm recording in recording mode, stop mode and power off mode with the selected recording speed.

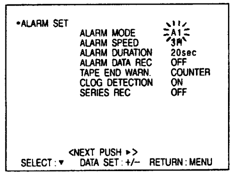
Connecting an Alarm Sensor



Setting the Alarm Speed and Duration

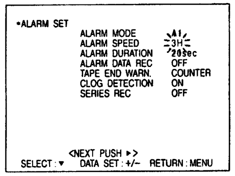


1. Turn on the power of the equipment to be used.
2. Press MENU and MENU ▼ until "3" of the MAIN MENU flashes on the monitor screen.
3. Press MENU ▶.
   The ALARM SET menu appears.



```
*ALARM SET
            ALARM MODE          A1
            ALARM SPEED         3H
            ALARM DURATION      20sec
            ALARM DATA REC      OFF
            TAPE END WARN.      COUNTER
            CLOG DETECTION      ON
            SERIES REC          OFF




          <NEXT PUSH ▸>
 SELECT : ▾   DATA SET : +/–   RETURN : MENU
```

4. Press MENU ▼ to move the flashing to the setting of ALARM SPEED and set it by pressing MENU + or –.

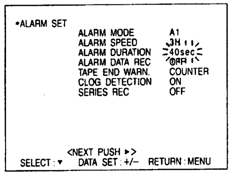


```
*ALARM SET
            ALARM MODE          A1
            ALARM SPEED         3H
            ALARM DURATION      20sec
            ALARM DATA REC      OFF
            TAPE END WARN.      COUNTER
            CLOG DETECTION      ON
            SERIES REC          OFF




          <NEXT PUSH ▸>
 SELECT : ▾   DATA SET : +/–   RETURN : MENU
```

Set ALARM SPEED to 3H, 12H, 24H or NC by pressing MENU + or –.

3H: for recording in 3-hour mode
12H: for recording in 12-hour mode
24H: for recording in 24-hour mode
NC: for recording at the same speed as before the alarm was received.

5 Press MENU ▼ to move the flashing to the setting of ALARM DURATION and set 20sec, 40sec, 1min, 2min, 3min, 4min, 5min or CC by pressing MENU + or –.



```
*ALARM SET
            ALARM MODE         A1
            ALARM SPEED        3H
            ALARM DURATION     40sec
            ALARM DATA REC     OFF
            TAPE END WARN.     COUNTER
            CLOG DETECTION     ON
            SERIES REC         OFF

          <NEXT PUSH ▸>
 SELECT : ▾   DATA SET : +/–   RETURN : MENU
```

20sec - 5min: for recording for 20 seconds, 40 seconds, 1 minute, 2 minutes, 3 minutes, 4 minutes or 5 minutes

CC: for recording as long as the alarm signal is being input

6 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

Press MENU again.

To go to the next menu from the current menu

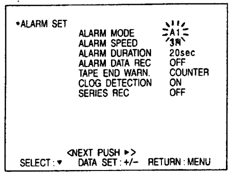
Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Setting the Alarm Recording Mode

1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "3" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The ALARM SET menu appears.



```
*ALARM SET
            ALARM MODE         A1
            ALARM SPEED        3H
            ALARM DURATION     20sec
            ALARM DATA REC     OFF
            TAPE END WARN.     COUNTER
            CLOG DETECTION     ON
            SERIES REC         OFF

          <NEXT PUSH ▸>
 SELECT : ▾   DATA SET : +/–   RETURN : MENU
```

4 Set ALARM MODE to A1, A2, A3 or OFF by pressing MENU + or –.
A (alarm)1: always accepts alarms.
A2: accepts alarms only when timer recording is proceeding.
A3: accepts alarms only when timer recording is not proceeding.
OFF: does not accept alarm even if an alarm signal is received.

5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu

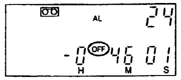
Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

Notes

- While alarm recording is in progress, other modes are inoperable.
- After the alarm recording is completed, the VCR returns to the condition it was in before the alarm signal was received.
- If an alarm input is received while the VCR is in repeat recording (see page 20), repeat recording stops and the REPEAT indicator goes out. After the tape reaches the end, the tape is rewound and the VCR stops. The OFF indicator lights in the display window (only when REPEAT 1 is selected for TAPE END MODE in the GENERAL SET menu).

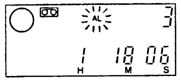


- When the OFF indicator lights, in order to prevent accidental erasure of a recorded tape, timer recording and alarm recording cannot be executed.
If any of REC ●, FF ▶▶, REW ◀◀, PLAY ▶, STOP ■ is pressed, the OFF indicator goes out.
- If another alarm is received while alarm recording is in progress, the second alarm recording starts and the recording duration is extended.
- If the power is interrupted while alarm recording is in progress and restored again, the operation before the alarm recording was made resumes.

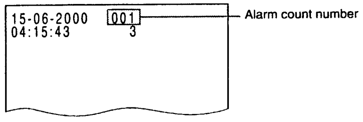
Alarm Recording

Indicators during alarm recording

The AL indicator flashes in the display window.

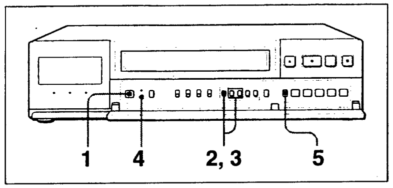


The count of the alarm recording flashes on the monitor screen.
The alarm recording can be counted up to 999.
When the alarm function has worked 1000 times, the count number returns to 000.



```
15-06-2000   001
04:15:43       3
```

To Reset the Alarm Count



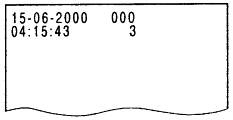
1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "8" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The ALARM DATA menu appears.

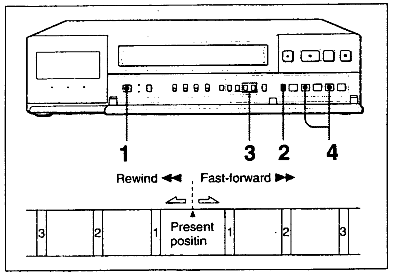
4 Press MENU RESET.

5 Press SEARCH to return to the normal display.
The count on the screen are reset to 000.



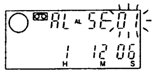
```
15-06-2000   000
04:15:43       3
```

Searching the Picture of the Alarm Recordings — Alarm Search

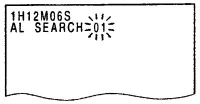


1 Turn on the power of the equipment to be used.

2 Press SEARCH in stop mode until the alarm search indicator flashes in the display window and on the screen.



In the display window



```
1H12M06S
AL SEARCH 01
```

On the monitor

3 Press REC/PLAY SPEED + or – to set the alarm search number (1 to 100).

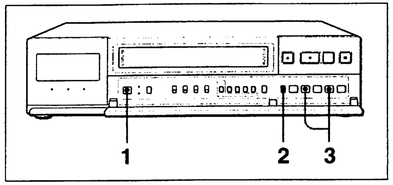
4 Press FF ▶▶ or REW ◀◀.
The cassette stops at the portion where the alarm function worked and the still picture playback is displayed.

Press STOP ■, PLAY ▶, FF ▶▶ or REW ◀◀ to release alarm search mode.

Notes

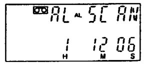
- If the tape is reached the end during searching, the tape is rewound and the VCR enters the stop mode at the beginning of the tape.
- You can use the alarm search only when the tape is recorded in 3-hour alarm recording mode and the recorded section is longer than 20 seconds.

Scanning the Picture of the Alarm Recordings — Alarm Scan

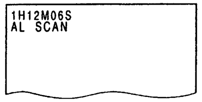


1 Turn on the power of the equipment to be used.

2 Press SEARCH in stop mode until AL SCAN lights in the display window or on the monitor screen.



In the display window



```
1H12M06S
AL SCAN
```

On the monitor

3 Press FF ▶▶ or REW ◀◀.
The portions where the alarm function worked are subsequently played back for five seconds one by one.

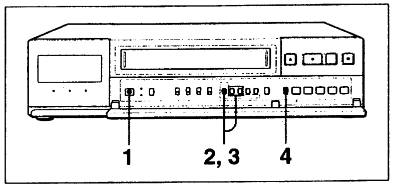
Press PAUSE ❙❙ to view a certain scene in still mode. (Alarm scan mode will be released.)

Press STOP ■, PLAY ▶, FF ▶▶ or REW ◀◀ to release alarm scan mode.

Notes

- If the tape reaches the end during scanning, the tape is rewound and the unit enters the stop mode at the beginning of the tape.
- You can use the alarm scan only when the tape is recorded in 3-hour alarm recording mode and the recorded section is longer than 20 seconds.

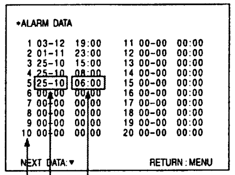
Displaying the Alarm List — Alarm Recall



1 Turn on the power of the equipment to be used.

2 Press MENU and MENU ▼ until "8" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The ALARM DATA list appears.
The alarm count, date and time are displayed.
The date and time are displayed up to recent 100 times.



```
*ALARM DATA

 1 03-12  19:00     11 00-00  00:00
 2 01-11  23:00     12 00-00  00:00
 3 25-10  15:00     13 00-00  00:00
 4 25-10  08:00     14 00-00  00:00
 5 25-10  06:00     15 00-00  00:00
 6 00-00  00:00     16 00-00  00:00
 7 00-00  00:00     17 00-00  00:00
 8 00-00  00:00     18 00-00  00:00
 9 00-00  00:00     19 00-00  00:00
10 00-00  00:00     20 00-00  00:00

NEXT DATA:▼               RETURN : MENU
```

4 Press SEARCH to return to the normal display.

To go to the next page of ALARM DATA

Press MENU ▼

To return to the MAIN MENU screen from the current menu

Press MENU.

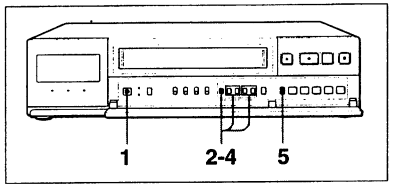
When the alarm data reaches more than 100

The oldest one will be erased.

To reset the alarm data

Press MENU RESET while the ALARM DATA menu is on the screen.
The alarm count shows "000".

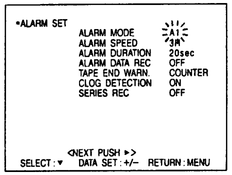
Recording the Alarm Data on the Tape



1 Turn on the power of the equipment to be used.

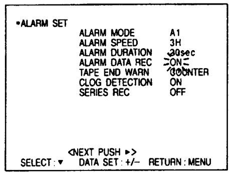
2 Press MENU and MENU ▼ until "3" of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The ALARM SET menu appears.



```
*ALARM SET
            ALARM MODE         A1
            ALARM SPEED        3H
            ALARM DURATION     20sec
            ALARM DATA REC     OFF
            TAPE END WARN.     COUNTER
            CLOG DETECTION     ON
            SERIES REC         OFF

          <NEXT PUSH ▶>
 SELECT : ▼   DATA SET : +/-   RETURN : MENU
```

4 Press MENU ▼ to move the flashing to the setting of ALARM DATA REC and set to ON by pressing MENU + or –.



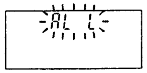
```
*ALARM SET
            ALARM MODE         A1
            ALARM SPEED        3H
            ALARM DURATION     30sec
            ALARM DATA REC     ON
            TAPE END WARN      COUNTER
            CLOG DETECTION     ON
            SERIES REC         OFF

          <NEXT PUSH ▶>
 SELECT : ▼   DATA SET : +/-   RETURN : MENU
```

ON (in recording mode): when the recording comes to the end, the VCR rewinds the tape to the beginning and starts recording the alarm data on the ALARM DATA menu up to 100 data.

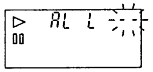
ON (in playback mode):

1 When the tape is inserted, the VCR rewinds the tape to the beginning.

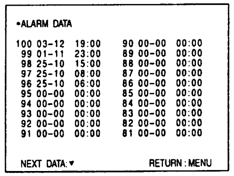
2 Press SEARCH until "AL L" flashes in the display window.



3 Press REW ◀◀.
The ALARM DATA list appears.
To change the page of the ALARM DATA, press FF ▶▶ or REW ◀◀. (You may have to press the button a few times.)



In the display window



```
*ALARM DATA

100 03-12  19:00     90 00-00  00:00
 99 01-11  23:00     89 00-00  00:00
 98 25-10  15:00     88 00-00  00:00
 97 25-10  08:00     87 00-00  00:00
 96 25-10  06:00     86 00-00  00:00
 95 00-00  00:00     85 00-00  00:00
 94 00-00  00:00     84 00-00  00:00
 93 00-00  00:00     83 00-00  00:00
 92 00-00  00:00     82 00-00  00:00
 91 00-00  00:00     81 00-00  00:00

NEXT DATA:▼                RETURN : MENU
```

On the monitor

4 Press MENU + or – to set the alarm count and then press FF ▶▶.
The tape runs to the set alarm count and the playback picture appears in the still mode.

Example:

To go to the 11th alarm count
Press MENU + or – to display 11 and press FF ▶▶. The alarm count in the display window counts down and becomes 00 after 10.

To go to the 15th alarm count after going to the 11th
Press MENU + or – to display 04 and press FF ▶▶ until 00 appears.

To go back to the 7th alarm count after going to the 11th
Press MENU + or – to display 04 and press REW ◀◀ until 00 appears.

OFF (in recording mode): the VCR does not record the alarm data on the tape.
OFF (in playback mode): the VCR enters normal alarm search mode.

5 Press SEARCH to release the alarm data search mode.

To return to MAIN MENU from the current menu

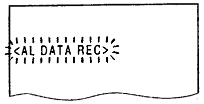
Press MENU again.

To go to the next menu from the current menu

Press MENU ▼ until "NEXT PUSH ▶" flashes and press MENU ▶.

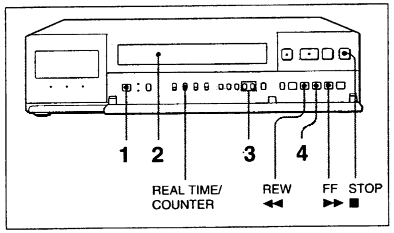
Notes

- When ALARM DATA REC is set to ON, the VCR automatically rewinds the tape when inserted. While the VCR is rewinding the tape, "<AL DATA REC>" flashes on the monitor screen.



- In ALARM DATA REC mode the VCR does not record the 101st or higher alarm data, but it does the alarm operation.
- If the tape on which the alarm data is not recorded is inserted, a still picture will be displayed at the point where the recording started.
- If the required alarm count cannot be found, the VCR will rewind the tape when the tape comes to the end and stop at the beginning of the tape.
- The ALARM DATA will be reset when:
  - –the tape is ejected while recording in ALARM DATA REC mode.
  - –all the ALARM DATA are recorded.
  - –ALARM DATA REC is reset to OFF from ON.
- You can use the ALARM DATA list only when the tape is recorded in 3-hour alarm recording mode and the recorded section is longer than 20 seconds.
- While recording of the ALARM DATA list is in progress, the REC indicator lights in the display window.

Playback



1 Turn on the power of the equipment to be used.

2 Insert the cassette.

3 Select the playback speed by pressing REC/PLAY SPEED – or +.
The selected playback speed is displayed in the display window.

4 Press PLAY ▶.
Playback starts.

To stop playback

Press STOP ■.

To rewind the tape

Press STOP ■ and then REW ◀◀.

To fast-forward the tape

Press STOP ■ and then FF ▶▶.

Resetting the tape counter

The tape counter in the display window helps you to locate a certain scene after playback. Set the REAL TIME/COUNTER switch to COUNTER and press COUNTER RESET to set the counter to "0H00M00S" (counter zero) position before playing back the tape. The VCR keeps counting the length of the tape being played back. Note, however, that the tape counter will not count the portions without video signals.

Notes

- You cannot play back tapes recorded on other time-lapse VCRs on this VCR and vice versa.
- If ALARM DATA REC in the ALARM SET menu and/or TAPE USED COUNT in the GENERAL SET menu is set to ON, the VCR will rewind the tape and playback will start from the beginning of the tape. While the VCR is rewinding the tape, "<ALARM DATA REC>" and/or "<TAPE USED COUNT>" flashes on the monitor screen.

Playback speed

You can view the playback picture at one of the following speeds.

Recording speed	Playback speed				
	3	12	24	48	72
3	1	1/4	1/8	1/16	1/24
12	4	1	1/2	1/4	1/6
24	8	2	1	1/2	1/3
48	16	4	2	1	2/3
72	24	6	3	3/2	1

For example, when a tape recorded in 72-hour mode is played back in 3-hour mode, you can view the playback picture at a speed 24 times faster than the recorded one.

Audio Playback

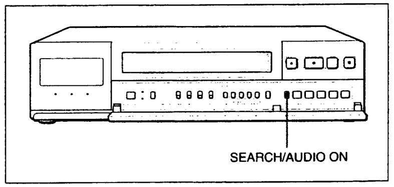
You can play back the sound with the picture if a tape is recorded in 3-, 12-, or 24-hour mode.
Play back the tape at the same speed at which it was recorded so that you can monitor the sound normally.

For audio playback in 3-hour mode

Play back the tape normally.

For audio playback in 12-hour or 24-hour mode

Press SEARCH/AUDIO ON in playback mode.
"A12" or "A24" is displayed in the display window.
To turn off the sound, press SEARCH/AUDIO ON again.



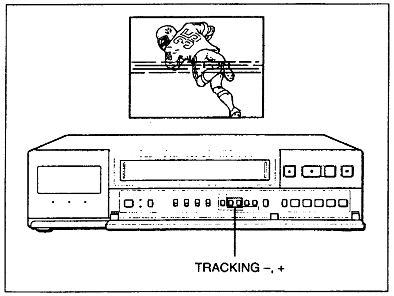
Note

Noise appears on the screen and the sound is distorted when you play back the picture in 12- or 24-hour mode.

Adjusting Pictures

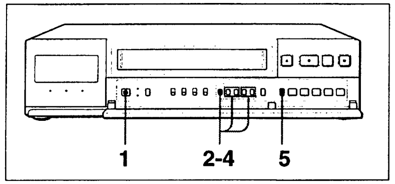
Adjusting the Tracking

If streaks or noise bands appear on the playback picture, adjust the tracking condition.
Use TRACKING – or +.



Using the Adaptive Picture Control (APC)

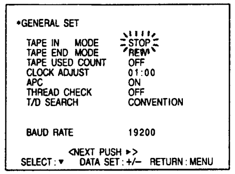
Adaptive Picture Control (APC) automatically improves recording and playback quality by adjusting the VCR to the condition of the video heads and tape. To maintain better picture quality, it is recommended to set APC to ON in the GENERAL SET menu.



1 Turn on the power of the equipment to be used.

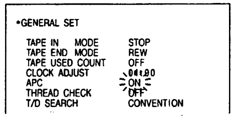
2 Press MENU and MENU ▼ until “4” of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The GENERAL SET menu appears.



```
•GENERAL SET

 TAPE IN   MODE       STOP
 TAPE END  MODE       REW
 TAPE USED COUNT      OFF
 CLOCK ADJUST         01:00
 APC                  ON
 THREAD CHECK         OFF
 T/D SEARCH           CONVENTION


 BAUD RATE            19200

        <NEXT PUSH ▶>
SELECT:▼   DATA SET:+/–  RETURN:MENU
```

4 Press MENU ▼ to move the flashing to the setting of APC and set to ON by pressing MENU + or –.



```
•GENERAL SET

 TAPE IN   MODE       STOP
 TAPE END  MODE       REW
 TAPE USED COUNT      OFF
 CLOCK ADJUST         01:00
 APC                  ON
 THREAD CHECK         OFF
 T/D SEARCH           CONVENTION
```

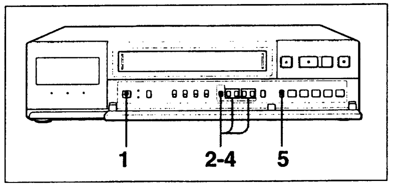
5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu
Press MENU again.

To go to the next menu from the current menu
Press MENU ▼ until “NEXT PUSH ▶” flashes and press MENU ▶.

Searching for the Time and Date — Time/Date Search

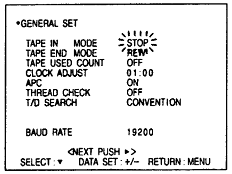
Selecting the Searching Interval



1 Turn on the power of the equipment to be used.

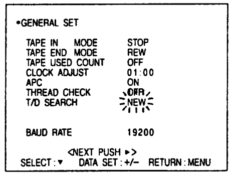
2 Press MENU and MENU ▼ until “4” of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The GENERAL SET menu appears.



```
•GENERAL SET

 TAPE IN   MODE       STOP
 TAPE END  MODE       REW
 TAPE USED COUNT      OFF
 CLOCK ADJUST         01:00
 APC                  ON
 THREAD CHECK         OFF
 T/D SEARCH           CONVENTION


 BAUD RATE            19200

        <NEXT PUSH ▶>
SELECT:▼   DATA SET:+/–  RETURN:MENU
```

4 Press MENU ▼ to move the flashing to the setting of T/D SEARCH and set to CONVENTION or NEW by pressing MENU + or –.



```
•GENERAL SET

 TAPE IN   MODE       STOP
 TAPE END  MODE       REW
 TAPE USED COUNT      OFF
 CLOCK ADJUST         01:00
 APC                  ON
 THREAD CHECK         OFF
 T/D SEARCH           NEW


 BAUD RATE            19200

        <NEXT PUSH ▶>
SELECT:▼   DATA SET:+/–  RETURN:MENU
```

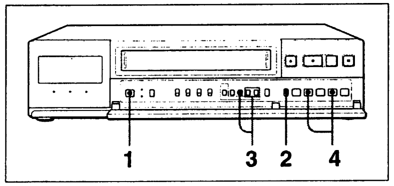
CONVENTION: to search every an hour
NEW: to search every 10 minutes

5 Press SEARCH to return to the normal display.

To return to the MAIN MENU screen from the current menu
Press MENU again.

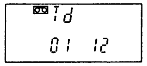
To go to the next menu from the current menu
Press MENU ▼ until “NEXT PUSH ▶” flashes and press MENU ▶.

Searching for the Time and Date

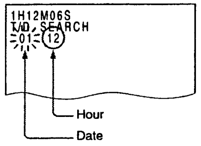


1 Turn on the power of the equipment to be used.

2 Press SEARCH in stop mode until the time/date search indicator flashes in the display window and on the monitor screen.
When CONVENTION is selected for T/D SEARCH on the GENERAL SET menu:

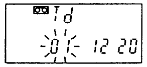


In the display window

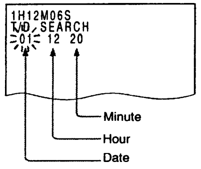


On the monitor

When NEW is selected for T/D SEARCH on the GENERAL SET menu:



In the display window



On the monitor

3 Press REC/PLAY SPEED + or – to set the date and press MENU ▶ to move the flashing to the time. Press + or – to set the time.

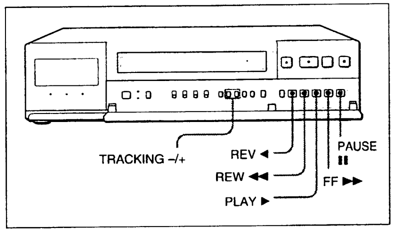
4 Press FF ▶▶ or REW ◀◀.
The cassette stops at the portion when you set the time and date and the still picture playback is displayed.
The time/date search mode is automatically cleared.

Note

If the tape reaches its end during searching, the tape is rewound and the unit enters the stop mode at the beginning of the tape.

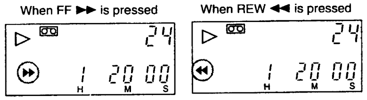
Various Playback Modes

You can play back picture at various modes: reverse playback, still and field by field pictures, and high-speed playback in both forward and reverse directions.



Picture Search

During playback, press FF ▶▶ (forward direction) or REW ◀◀ (reverse direction). A high-speed picture (about five times the normal speed in 3-hour mode) without sound appears on the monitor screen.
To resume normal playback, press PLAY ▶.



In the display window

Note

During picture search, streaks or noise band appear on the monitor screen.

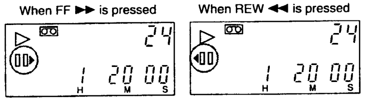
Still Picture

During playback, press PAUSE II.
To resume normal playback, press PAUSE II or PLAY ▶.
When the still mode lasts for more than approximately five minutes, the VCR will automatically stop.

If the picture shakes while in the still mode
Adjust the picture with TRACKING + or –.

Field-by-Field Picture

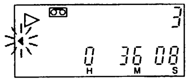
In the still mode, press FF ▶▶ or REW ◀◀.
Each time you press the button, the picture advances by one field.
When you hold the button down, the picture advances continuously.



In the display window

Reverse Playback

During playback, keep pressing REV ◀. Reverse playback picture appears on the screen.



In the display window

Notes

- During reverse playback, streaks appear on the monitor screen.
- This function works only during playback in 3H mode.

Maintenance

We recommend you check the VCR daily to confirm that the VCR works correctly.
When the security lock is in effect, release it before operating.

Perform the following checks before starting to record.

1. Turn on the camera, monitor, and this VCR.
2. Confirm that the picture from the camera appears on the monitor screen.
3. Confirm that the time and date display on the monitor is correct.
4. To check the recording condition of the previous day, rewind the tape for a few seconds and play back the tape.
5. Confirm that playback is normal.
6. Confirm that recorded time and date information is correct.

If you find any malfunction, switch all equipment off, unplug the VCR from the AC outlet, and consult your Sony dealer.

Cleaning Video Heads

After prolonged use, the video heads may become contaminated, which results in impaired picture quality (snow) or loss of picture. To avoid this, clean the video heads regularly.

Replacing Video Heads

If optimum picture quality is not restored even after you have cleaned the video heads, head replacement may be necessary. Please consult your Sony dealer.

Checking the Video Heads Every 1000 Hours

A VCR is a high-precision piece of equipment because it records or plays back the picture on a magnetic tape. In particular, the video head and other mechanical parts become dirty or worn. To maintain a clean picture, we recommend maintenance every 1000 hours.
To identify the service time, display the USED HOUR screen. (See page 23.)

Maintaining Mechanical Parts

When not used for long periods, the VCR should be switched on now and then set to the playback mode for about three minutes. This helps to prevent mechanical deterioration.

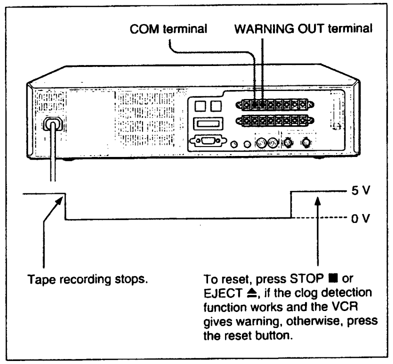
Servicing Periodically

To maintain optimum operating conditions and picture quality, periodic servicing (cleaning, lubrication, parts replacement) is necessary.
Please consult your Sony dealer.
If the VCR is to be used for critical monitoring purposes, it may be preferable to perform servicing at shorter intervals.

Terminals

WARNING OUT Terminal

This terminal will help you to know when something wrong has happened to the VCR during recording. The VCR outputs a pulse signal from WARNING OUT terminal.

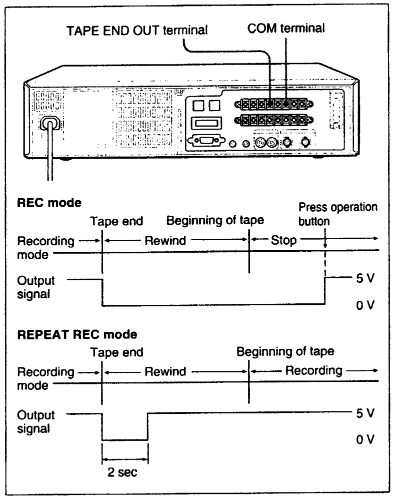

COM terminal
WARNING OUT terminal
5 V
0 V
Tape recording stops.
To reset, press STOP ■ or EJECT ⏏, if the clog detection function works and the VCR gives warning, otherwise, press the reset button.

Note

To turn the clog detection function off, set CLOG DETECTION to OFF on the ALARM SET menu.

TAPE END OUT Terminal

When the VCR detects the tape end or the time counter shows "3H" during recording, the output level becomes 0 V DC. To resume the 5 V output, press the operation button (EJECT ⏏, REC ●, FF ▶▶, REW ◀◀ or PLAY ▶, etc.).


TAPE END OUT terminal
COM terminal
REC mode
Tape end
Beginning of tape
Press operation button
Recording mode
Rewind
Stop
Output signal
5 V
0 V
REPEAT REC mode
Tape end
Beginning of tape
Recording mode
Rewind
Recording
Output signal
5 V
0 V
2 sec

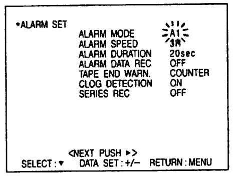
Set TAPE END WARN. to COUNTER or TAPE END on the ALARM SET menu.

- **COUNTER:** the time counter shows "3:00:00" and a signal is output from the TAPE END OUT terminal (recording will be continued to the end of the tape).
- **TAPE END:** the VCR detects the tape end.

1 Turn on the power of the equipment to be used.

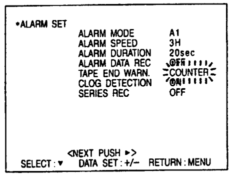
2 Press MENU and MENU ▼ until “3” of the MAIN MENU flashes on the monitor screen.

3 Press MENU ►.
The ALARM SET menu appears.



```
*ALARM SET
          ALARM MODE        A1
          ALARM SPEED       3H
          ALARM DURATION    20sec
          ALARM DATA REC    OFF
          TAPE END WARN.    COUNTER
          CLOG DETECTION    ON
          SERIES REC        OFF

        <NEXT PUSH ►>
 SELECT : ▼   DATA SET : +/–   RETURN : MENU
```

4 Press MENU ▼ to move the flashing to the setting of TAPE END WARN. and set to COUNTER or TAPE END by pressing MENU + or –.

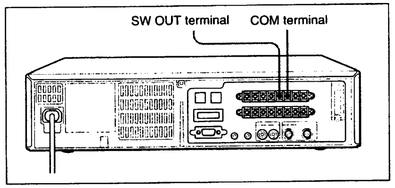


```
*ALARM SET
          ALARM MODE        A1
          ALARM SPEED       3H
          ALARM DURATION    20sec
          ALARM DATA REC    OFF
          TAPE END WARN.    COUNTER
          CLOG DETECTION    ON
          SERIES REC        OFF

        <NEXT PUSH ►>
 SELECT : ▼   DATA SET : +/–   RETURN : MENU
```

5 Press SEARCH to return to the normal display.

SW OUT Terminal

The VCR outputs a pulse signal from the SW (switch) OUT terminal to the camera switcher to control the switching from camera to camera.



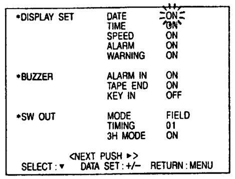
Specify the interval between each pulse signal on the DISPLAY SET/BUZZER/SW OUT menu. Also, set MODE to FIELD or FRAME depending on the specifications of the camera switcher.
Available settings are:

- **FIELD:** 1, 2, 3, 4, 5, 10, 30, or 60 fields
- **FRAME:** 1, 2, 3, 4, 5, 10, 30, or 60 frames

1 Turn on the power of the equipment to be used.

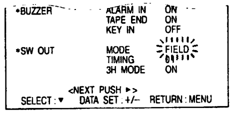
2 Press MENU and MENU ▼ until “2” of the MAIN MENU flashes on the monitor screen.

3 Press MENU ►.
The DISPLAY SET/BUZZER/SW OUT menu appears.



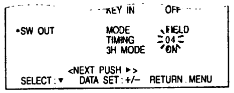
```
*DISPLAY SET        DATE        ON
                    TIME        ON
                    SPEED       ON
                    ALARM       ON
                    WARNING     ON

*BUZZER             ALARM IN    ON
                    TAPE END    ON
                    KEY IN      OFF

*SW OUT             MODE        FIELD
                    TIMING      01
                    3H MODE     ON

        <NEXT PUSH ►>
 SELECT : ▼   DATA SET : +/–   RETURN : MENU
```

4 Press MENU ▼ to move the flashing to the setting of MODE of SW OUT and set to FIELD or FRAME by pressing MENU + or – and press MENU ▼ again.



```
*BUZZER             ALARM IN    ON
                    TAPE END    ON
                    KEY IN      OFF

*SW OUT             MODE        FIELD
                    TIMING      01
                    3H MODE     ON

        <NEXT PUSH ►>
 SELECT : ▼   DATA SET : +/–   RETURN : MENU
```

5 Set TIMING by pressing MENU + or – and press MENU ▼.



```
                    KEY IN      OFF

*SW OUT             MODE        FIELD
                    TIMING      04
                    3H MODE     ON

        <NEXT PUSH ►>
 SELECT : ▼   DATA SET : +/–   RETURN . MENU
```

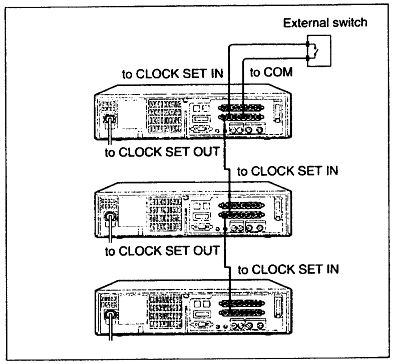
6 Set 3H (3-hour mode) MODE to ON or OFF by pressing MENU + or –.
ON: a signal is output in the 3-hour mode
OFF: a signal is not output in the 3-hour mode

7 Press SEARCH to return to the normal display.

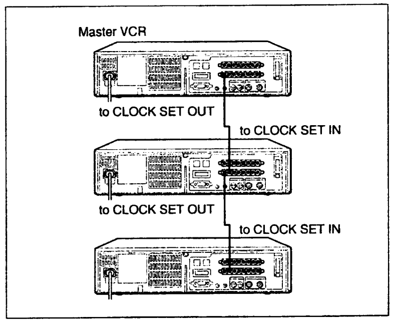
CLOCK SET IN/OUT Terminals

You can set the clock of this unit using an external switch.
When you use one unit as the master VCR, you can set the clock of the units connected to the master VCR using the master VCR.

When Using an External Switch



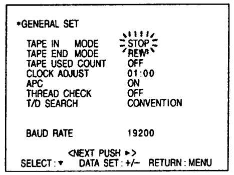
When Using One Unit as a Master VCR



1 Turn on the power of the equipment to be used.

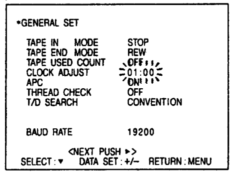
2 Press MENU and MENU ▼ until “4” of the MAIN MENU flashes on the monitor screen.

3 Press MENU ▶.
The GENERAL SET menu appears.



```
*GENERAL SET

 TAPE IN    MODE        STOP
 TAPE END   MODE        REW
 TAPE USED COUNT        OFF
 CLOCK ADJUST           01:00
 APC                    ON
 THREAD CHECK           OFF
 T/D SEARCH             CONVENTION


 BAUD RATE              19200

          <NEXT PUSH ▸>
SELECT:▾   DATA SET:+/-   RETURN:MENU
```

4 Press MENU ▼ to move the flashing to “01:00” of CLOCK ADJUST and set the time for clock setting by pressing MENU + or –.



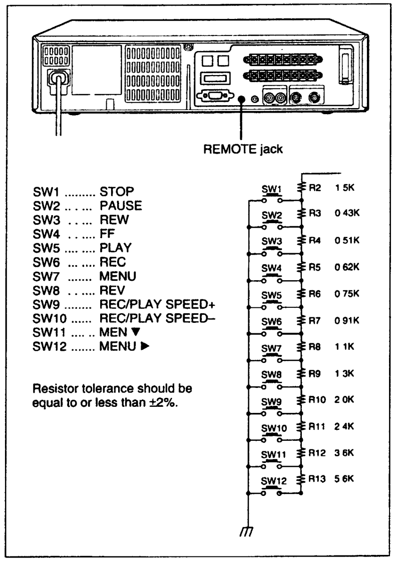
```
*GENERAL SET

 TAPE IN    MODE        STOP
 TAPE END   MODE        REW
 TAPE USED COUNT        OFF
 CLOCK ADJUST           01:00
 APC                    ON
 THREAD CHECK           OFF
 T/D SEARCH             CONVENTION


 BAUD RATE              19200

          <NEXT PUSH ▸>
SELECT:▾   DATA SET:+/-   RETURN:MENU
```

5 Press SEARCH to return to the normal display.

6 **When using an external switch:**
When you turn the switch on and an input signal is received at the CLOCK SET IN terminal, the clocks of all the connected VCRs will be set to the time adjusted in step 4.
When using one unit as the master VCR:
When the clock of the master VCR comes to the time adjusted in step 4, the signal will be output from the CLOCK SET OUT terminal to set the clocks of the other connected VCRs.

REMOTE Jack

The VCR can be remotely controlled by adding the circuit shown below to the REMOTE jack or by using the SVT-RM10 Remote Control Unit (not supplied).



SW1	STOP
SW2	PAUSE
SW3	REW
SW4	FF
SW5	PLAY
SW6	REC
SW7	MENU
SW8	REV
SW9	REC/PLAY SPEED+
SW10	REC/PLAY SPEED–
SW11	MEN ▼
SW12	MENU ▶

Resistor tolerance should be equal to or less than ±2%.

Notes

- Use a shielded cord less than 5 m (16 ft.) in length.
- The recording indicator on the SVT-RM10 does not light when using with this VCR.

Command Reference

Data format

RS-232C

Mode	Asynchronous
Character length	8 bits
Baud rate	2400, 4800, 9600 or 19200
Parity check	None
Stop bit	1 bit

The baud rate can also be set using the VCR menu. See page 11 for details.

Communication protocol

The communication is based on 1 byte unit. When the computer has transmitted 1 byte, it will wait for a response from the VCR, then send the next.
The response from the VCR consists of 1 byte or more (for example 6 bytes like the counter value).

RS-485

Mode	Asynchronous
Character length	8 bits
Baud rate	2400, 4800, 9600 or 19200
Parity check	None
Start bit	1 bit
Stop bit	1 bit

Transmission line: 2 conductors
Transmission system: Half duplex

Note

The commands depend on the VCR which you are going to use. Even if you send the commands which are not provided with your VCR, they do not function.

The received/transmitted (RXD/TXD) signal layout is indicated as seen from the VCR side.

The baud rate can also be set using the VCR menu. See page 11 for details.

Notes on using the RS-232C

To initiate command operation, send TL TABLE ON (F6H).
The VCR will responde with ACK (0AH).
The VCR will receive commands until you send TL TABLE OFF (F7H) to end command operations.

Notes on using the RS-485

If the address set using the DIP switches is not correct, the VCR will not operate.
When a group number is set, if it does not match the group number of the VCR, the VCR will not operate.

VCR Control Commands

The following commands are completed in 1 byte.
The VCR will respond with ACK (0AH). Confirm that ACK (0AH) is returned before sending the next command.

POWER ON/OFF (7BH)

Turns on or off the VCR.

PLAY (3AH)

Plays back a tape.

STILL/PAUSE (4FH)

Pauses tape.
When this command is sent while recording, the VCR enters recording pause mode

STOP (3FH)

Stops tape.

FF (ABH)

Fast forwards the tape.
When this command is sent while playing, the VCR enters playback in fast-forward mode.
During pause, the VCR plays back still picture.
During alarm search/scan or date/time search, the VCR switches to forward search/scan.

REW (ACH)

Rewinds the tape.
When this command is sent while playing, the VCR enters playback in reverse.
During pause, the VCR plays back still picture in reverse.
During alarm search/scan or date/time search, the VCR switches to reverse search/scan.

REV PLAY (4AH)

Plays back a tape in reverse at normal speed.

TIMER ON/OFF (60H)

Switches on/off timer recording.

SECURITY LOCK ON (69H)

Switches on security lock.

SECURITY LOCK OFF (7AH)

Switches off security lock.

AUDIO/SEARCH (22H)
When this command is sent while playing in the 12/24 hour mode, the sound switches on/off.
During stop, the VCR enters alarm search/scan or date/time search mode.
When the menu is displayed, this command ends the menu.

EJECT (A3H)
Ejects the tape.
The VCR returns ACK (0AH) as soon as it receives this command, then returns to CASSETTE OUT (03H) after it ejects the tape.

REC/DUB REQUEST (FAH)
Send this command just before you send the REC (CAH) command.

REC (CAH)
Records.
Before sending this command, you need to send REC/DUB REQUEST (FAH).

```
RXD FA    CA
TXD    0A    0A
```

ALARM SCAN (B1H)
Initiates scanning of alarm points.
Send this command, then send FF to scan forward or REW to scan backward.
When the alarm recording start point is located after alarm scan, the VCR returns COMPLETION (01H).
If the tape comes to the end or beginning without the alarm recording start point being located, the VCR returns NOT TARGET (05H).

```
RXD B1  \ AB
TXD    0A \  0A
```

REC CHECK (C1)
When this command is sent while recording, tape is rewound three seconds then played back two seconds. With this operation, the VCR checks that the recording is correct. After playback, the VCR returns to recording mode.

The use the following commands, send the command, wait for the response ACK (0AH), then send the numeric data value (30H to 39H) 1 byte at a time. Finally, send the ENTER (40H) command.
When the desired point is located, the VCR returns COMPLETION (01H).
If the tape comes to the end or beginning without the desired point being located, the VCR returns NOT TARGET (05H).

ALARM SEARCH/ALARM DATA LIST (B0H)
Initiates search for a specific alarm point.
Send this command, then enter the alarm point and send the end command (40H).
Send the FF to search forward or REW to search backward.
Example: To search forward for the 10th alarm point

```
RXD B0    31    30    40  \ AB
TXD    0A    0A    0A    0A \  0A
```

Send this command to display the ALARM DATA list.

```
RXD B0    31    40  \ AC
TXD    0A    0A    0A \  0A
```

DATE/TIME/MINUTE SEARCH (B3H)
Initiates search for a specific date/time/minute.
Send this command, followed by the date, time and minute then send the end command (40H).
Send the FF to search forward or REW to search backward.
Example: To search forward for the 16th, 15:10.

```
RXD B3    31    36    31    35    31    30    40  \ AB
TXD    0A    0A    0A    0A    0A    0A    0A    0A \  0A
```

DATE/TIME SEARCH (B2H)
Initiates search for a specific date/time.
Send this command, followed by the date and time then send the end command (40H).
Send the FF to search forward or REW to search backward.
Example: To search forward for the 16th, 15 o'clock.

```
RXD B2    31    36    31    35    40    AB
TXD    0A    0A    0A    0A    0A    0A    0A
```

Note

When T/D SEARCH is set to CONVENTION on the GENERAL SET menu and this command is sent, the VCR will return NAK (0B). (B3H command)
When T/D SEARCH is set to NEW and this command is sent, "00" will be input as the unit of the minute. (B2H command)

VCR Setup Commands

R/P SPEED SET (7EH)
Sets the recording/playback speed.
Send 3 bytes of numeric data (30H to 39H) after the R/P SPEED SET (7EH) command and then send the end command (40H).
Example: Setting the speed to 24H

```
RXD 7E    30    32    34    40
TXD    0A    0A    0A    0A    0A
```

COUNT RESET (E2H)
Resets the counter.

CLOCK ADJUST (E0H)
When this command is sent during stop, it resets the minute and second to 00 . For example, when this command is sent between 13:30:00 and 14:29:59, the clock is reset to 14:00:00.

TRACKING UP (50H)
Sets the tracking one step up.
When this commend is sent during pause, it sets the vertical alignment one step up.

TRACKING DOWN (51H)
Sets the tracking one step down.
When this commend is sent during pause, it sets the vertical alignment one step down.

TRACKING CENTER (52H)
Sets the tracking to the neutral position (center).

Menu Setup Commands

MENU (74H)
Displays the menu.

MENU ▼ (64H)
Shifts the cursor on the menu to the item below.
Moves the date/time display down wards.

MENU ▶ (63H)
Displays the sub-menu.
Moves the date/time display rightwards.

MENU + (65H)
MENU – (66H)
Changes the setting of the selected item.

MENU RESET (E1H)
Resets menu settings.

VCR Status Commands

When the VCR status commands are entered, the VCR responds with the information (data) about each command.

COUNT CODE (D0H)
In response to this command, the VCR returns the counter value by 6 bytes.
Example: For –1:23:45, 31H, 31H, 32H, 33H, 34H, 35H will be returned.
30H indicates + and 31H indicates –.

```
RXD D0
TXD    31    31    32    33    34    35
```

VCR INQUIRY (FB)
Confirms that the connected equipment is a VCR. The VCR returns ACK (0A).

HEAD TIME (D2H)
In response to this command, the VCR returns the operation time of the video heads by 5 bytes.
Example: For 00333, 30H, 30H, 33H, 33H, 33H will be returned.

```
RXD D2
TXD    30    30    33    33    33
```

POWER TIME (D3H)
In response to this command, the VCR returns the power on the by 5 bites.
Example: For 00777, 30H, 30H, 37H, 37H, 37H will be returned.

```
RXD D3
TXD    30    30    37    37    37
```

T/L STATUS SENSE (D6H)
In response to this command, the VCR returns its status by 5 bytes.
(See "T/L STATUS SENSE (D6H) bit allocation" for details.)

STATUS SENSE (D7H)
In response to this command, the VCR returns its operating mode by 5 bytes.
(See "STATUS SENSE (D7H) bit allocation" on page 53 for details.)

Other Commands

ENTER (40H)
Send this command to indicate the end of a numeric command.

CLEAR (56H)
Clears all the commands.
Clears if an error occurs.

CLEAR ERROR (41H)
Clears the last byte entered of a multiple-byte command.
Clears if an error occurs.

Return Commands

ACK (0AH)
Acknowledges the command.

NOT TARGET (05H)
Notifies that the tape has come to the end or beginning without the search/scan point being located, as well as that the search/scan has been canceled.

COMPLETION (01H)
Notifies that a search/scan point has been located.
Notifies that an alarm picture has been found during scan.

ERROR (02H)
Indicates an error in the second or following byte of a multiple-byte command. You cannot send any command but the VCR returns its status. To clear an error, send CLEAR ERROR (41H) or CLEAR (56H).

NAK (0BH)
Rejects the command if you send an unknown command (or a command without any function).

T/L STATUS SENSE (D6H) bit allocation

First, second, third bytes: Indicates the time lapse recording/playback speed
Byte 1 : Indicates the first digit
2: Indicates the second digit
3: Indicates the third digit
Example: 24-hour mode
Byte 1: 30
Byte 2: 32
Byte 3: 34

Fourth byte
Bit 7: ALARM REC MODE ON; the VCR is in alarm recording mode.
6: 1 SHOT REC MODE ON; the VCR is in 1-shot recording mode.
5: SERIES REC MODE ON; SERIES REC is set to ON in the ALARM SET menu.
4: TIMER REC MODE ON; the VCR is in timer recording or timer recording standby mode.
3: 0
2: 0
1: POWER ON; the VCR is turned on.
0: AUDIO ON; the VCR is in audio playback mode.

Fifth byte
Bit 7: MENU MODE; the menu is displayed.
6: T/D SEARCH MODE; the VCR is in searching for a time/date.
5: T/D SEARCH SET; specifying the time/date to search
4: ALARM SCAN MODE; the VCR is scanning alarm points.
3: 0
2: ALARM SEARCH MODE; the VCR is searching for an alarm point.
1: ALARM SEARCH SET; specifying the alarm point to search
0: 0

STATUS SENSE (D7H) bit allocation

First byte
Bit 7: 1
6: 0
5: 0
4: REC INHIBIT; the tape with the tab broken is inserted.
3: CASSETTE OUT; no tape is inserted.
2: 0
1: 0
0: ERROR; error in byte data. Send CLEAR ERROR (41H) or CLEAR (56H) to accept other command.

Second byte
Bit 7: 0
6: 0
5: 0
4: 0
3: WARNING; a warning is being issued because there is something wrong with the VCR.
2: 0
1: 0
0: 0

Third byte
Bit 7: 0
6: TIMER REC ON; the VCR is in timer recording mode.
5: 0
4: 0
3: 0
2: REPEAT MODE; the VCR is in repeat recording mode.
1: 0
0: 0

Fourth byte
Bit 7: PLAY MODE; the VCR is in playback mode.
6: FF MODE; the VCR is in fast-forward mode.
5: REW MODE; the VCR is in rewind mode.
4: STOP MODE; the VCR is in stop mode.
3: RVS PLAY; the VCR is in reverse playback mode.
2: EJECT; the VCR is ejecting a tape.
1: REC MODE; the VCR is in recording mode.
0: 0

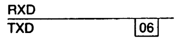
Fifth byte
Bit 7: 0
6: 0
5: CUE MODE; the VCR is in forward search mode.
4: REVIEW MODE; the VCR is in reverse search mode.
3: 0
2: 0
1: PAUSE MODE; the VCR is in recording pause mode.
0: STILL MODE; the VCR is in playback pause or frame-by-frame mode.

RS-232C Commands

T/L TABLE ON (F6H)
Starts controling the VCR.

T/L TABLE OFF (F7H)
Stops controling the VCR.

ALARM IN (06H)
The VCR returns this command when an alarm signal is received.



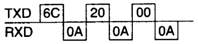
CASSETTE OUT (03H)
The VCR returns this command when the cassette is ejected.

RS-485 Commands

GROUP SET (6CH)

Divides into groups (puts group numbers). In response to this command, the VCR returns the group number by 2 bytes.

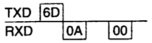
Example: Setting to the group 5



GROUP CHECK (6DH)

Returns the group number.

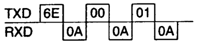
Example: When the group number is 2



GROUP CLEAR (6EH)

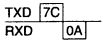
Clears the group number. In response to this command, the VCR returns the group number by 2 bytes.

Example: When the group number is 8



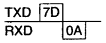
SET ON (7CH)

Turns on the VCR no matter if it is turned on or off.



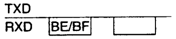
SET OFF (7DH)

Turns off the VCR no matter if it is turned on or off.



RS-485 Return Commands

When the RS-485 connector is used and you operate on the VCR, the VCR automatically returns a status information of 2 bytes.



First byte: Header (BEH or BFH)
Second byte: Status information

When first byte is BFH
Bit 0, 1, 2, 3, 4: displays what mode the VCR is in.
0,0,0,0,0: no change
1,0,0,0,0: the VCR is turned on without a tape.
0,1,0,0,0: the VCR is turned off without a tape.
1,1,0,0,0: the VCR is turned on with a tape inserted.
0,0,1,0,0: the VCR is turned off with a tape inserted.
1,0,1,0,0: the VCR is in timer recording standby mode.
0,1,1,0,0: the VCR is playing back still picture.
1,1,1,0,0: the VCR is in recording pause mode.
0,0,0,1,0: the VCR is playing back a tape.
1,0,0,1,0: the VCR is recording.
0,1,0,1,0: the VCR is playing back a tape in reverse direction.
1,1,0,1,0: the VCR is fast-forwarding a tape.
0,0,1,1 0: the VCR is rewinding a tape.
1,1,1,1,0: the VCR is playing back frame by frame.
0,0,0,0,1: the VCR is playing back frame by frame in reverse direction.

Bit 5, 6: displays when the VCR starts or ends the alarm recording.
0,0: the VCR is in normal mode.
0,1: the VCR starts the alarm recording.
1,0: the VCR ends the alarm recording.

Bit 7: indicates warning.
1: the VCR has a mechanical problem.
0: normal

Table of Commands

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0				0	ENTER	TRACKING UP	TIMER ON/OFF					ALARM SEARCH		COUNT CODE	CLOCK ADJUST	
1	COMPLETION			1	CLEAR ERROR	TRACKING DOWN						ALARM SCAN			MENU RESET	
2	ERROR		AUDIO/ SEARCH	2		TRACKING CENTER						DATE/ TIME SEARCH		HEAD TIME	COUNT RESET	
3	CASSETTE OUT			3			MENU ▶				EJECT	DATE/ TIME/ MIN SEARCH		POWER TIME		
4				4			MENU ▼	MENU								
5	NOT TARGET			5			MENU +									
6	ALARM IN			6		CLEAR	MENU –							T/L STATUS SENSE		T/L TABLE ON
7				7										STATUS SENSE		T/L TABLE OFF
8				8												
9				9			SECURITY LOCK ON									
A	ACK			PLAY	REV PLAY		SECURITY LOCK OFF						REC			REC/ DUB REQUEST
B	NAK							POWER ON/OFF			FF					VCR INQ
C							GROUP SET	SET ON			REW					
D							GROUP CHECK	SET OFF								
E							GROUP CLEAR	R/P SPEED SET								
F				STOP	STILL/ PAUSE											

Troubleshooting

This section may help you isolate the problem. Should the problem persist, unplug the unit and contact your Sony dealer or local authorized Sony service facility.

Symptom	Possible cause	Corrective action
The picture does not appear on the monitor screen.	Wrong connection.	Check the connection. (See page 8.)
	No power is provided to video camera and/or monitor TV.	Turn on the power.
The VCR does not respond when you press any button.	No cassette.	Insert a cassette.
	Moisture condensation has occurred.	Leave the VCR until its temperature reaches the room temperature. (See page 22.)
	The VCR is in the alarm recording.	Wait for the alarm recording to finish.
	The security lock function is working.	Release the security lock. (See page 20.)
	The VCR is in timer-recording standby mode or during timer recording.	Press TIMER.
Recording cannot be done. (The tape ejects automatically.)	The safety tab on the cassette has been removed.	Cover the tab hole with plastic tape. (See page 17.)
Repeat recording cannot be done.	Alarm recording was made during repeat recording.	This is normal.
	REPEAT REC is set to OFF.	Set REPEAT REC to ON. (See page 20.)
Timer recording was not made.	Clock setting is not correct.	Set the clock correctly. (See page 13.)
	TIMER is not set to on.	Press TIMER to display the ⏲ indicator. (See page 27.)
Playback picture flickers or blurs.	Video heads are dirty.	Clean the video heads.
Time and date were not recorded.	The time/date display is not displayed.	Set the time/date display. (See page 15.) Set ON-SCREEN to ON. (See page 15.)
The tape does not eject.	System trouble.	Turn the power off and on again to reset the system.
The VCR does not function except to play back the tape.	The power of the equipment to be used is not turned on.	Turn on the power.
The ERROR display appears on the screen.	There is a problem with your unit.	Please contact your Sony dealer.

Specifications

General

Recording method	Dual-head rotating helical scanning system
Audio recording	In 3-, 12- and 24-hour modes
Tape speed	23.39 mm/sec (3-hour mode)
Specified video cassette tape	VHS 1/2 inch video cassette tape
Recording/playback time	3, 12, 24, 48 and 72 hours (when using E-180 tape)
Fast-forward/rewind time	Approx. 100 seconds (when using E-180 tape)
Colour system	PAL colour

Video

Recording method	Luminance signal: FM method Colour signal: Subcarrier low frequency conversion methed
Input	BNC: 1 Vp-p, 75 Ω unbalanced
Output	BNC: 1 Vp-p, 75 Ω unbalanced
Horizontal resolution	Black & white mode: 350 lines Colour mode: 240 lines
S/N	44 dB

Audio

Input	–8 dBs, phono jack 47 kΩ unbalanced
Output	–8 dBs, phono jack 600 Ω unbalanced
Microphone input	–60 dBs, ø3.5 mm minijack, 600 Ω
S/N	40 dB

Connector

Alarm input	Low level
Alarm output	+5 V, 5.7 kΩ (Low active)
Switch output	+5 V, 5.7 kΩ
Tape end output	+5 V, 5.7 kΩ (Low active)
Warning output	+5 V, 5.7 kΩ (Low active)
External timer input	Low level
Clock set output	+5 V, 5.7 kΩ (Low active)
Clock set input	Low level
Series output	+5 V, 5.7 kΩ (Low active)
Series input	Low level
Remote control input	ø3.5 mm stereo minijack

Other specifications

Operating temperature range	5°C to 40°C
Operating humidity range	80% or less
Power supply	220 - 240 V, 50 Hz
Power consumption	14 W
External dimensions	Approx. 420 × 100 × 300 mm (w/h/d) (16 5/8 × 4 × 11 7/8 in.)
Mass	Approx. 4.3 kg (9 lb 6 oz)

Supplied accessory

AC power cord (1)
Operating instructions (1)

Optional accessories

SVT-RM10 Remote Control Unit

Design and specifications are subject to change without notice.

Section 2
Service Information

2-1. Disassembly

2-1-1. Removal of Cabinet, Mechanism Unit and Main Board

Removing the Cabinet Parts (Fig. 2-1-1)

1. Remove the cabinet and bottom cover by removing the four screws (1) and five screws (2).
2. Remove the front panel by removing the locks of the clamps (A) using a screwdriver, etc. and slightly rotating the bottom part in the direction of the arrow.

Note:
- **Electrical adjustments for the this model can be performed with only the cabinet removed.**
- **When replacing the bottom cover, do not tighten the screws (2) too much. Excess tightness may damage the screws taps on the chassis.**

Removing the Mechanism Main Unit and the CP-1 PWB Assembly (Fig. 2-1-2 and 2-1-3)

1. Spread out the lock clamps (B) and (C) in the arrow direction slightly and remove the TM-1 PWB and TM-2 PWB as shown in Fig. 2-1-2.
2. Remove the screws (3) and (4) and (5) at the chassis.
3. Remove the screw (6) at the PW-1 PWB.
4. Remove the two screws (7) at the CP-1 board.
5. Remove the two screws (8) of the mechanism unit. The two screws (8) of the cassette tray can be removed easily by pushing the tray lock lever in the arrow direction to remove the lock as shown in the enlarge view A and by pushing the lid opener lever in the arrow direction to remove the lock as shown in the enlarge view B.
6. Lift up the whole mechanism unit and main board (CP-1 PWB assembly), and as shown in Fig. 2-1-3, push the two lock clamps (D) of the chassis in the arrow direction so that they can be removed from the chassis.

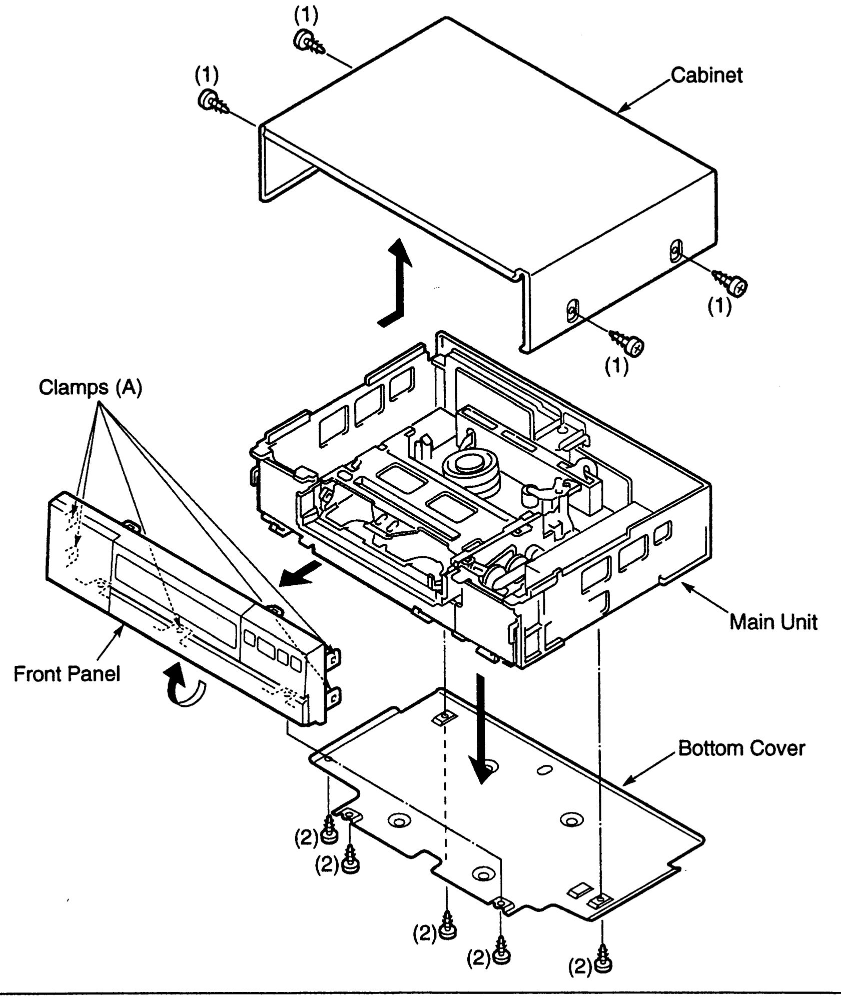


Fig. 2-1-1

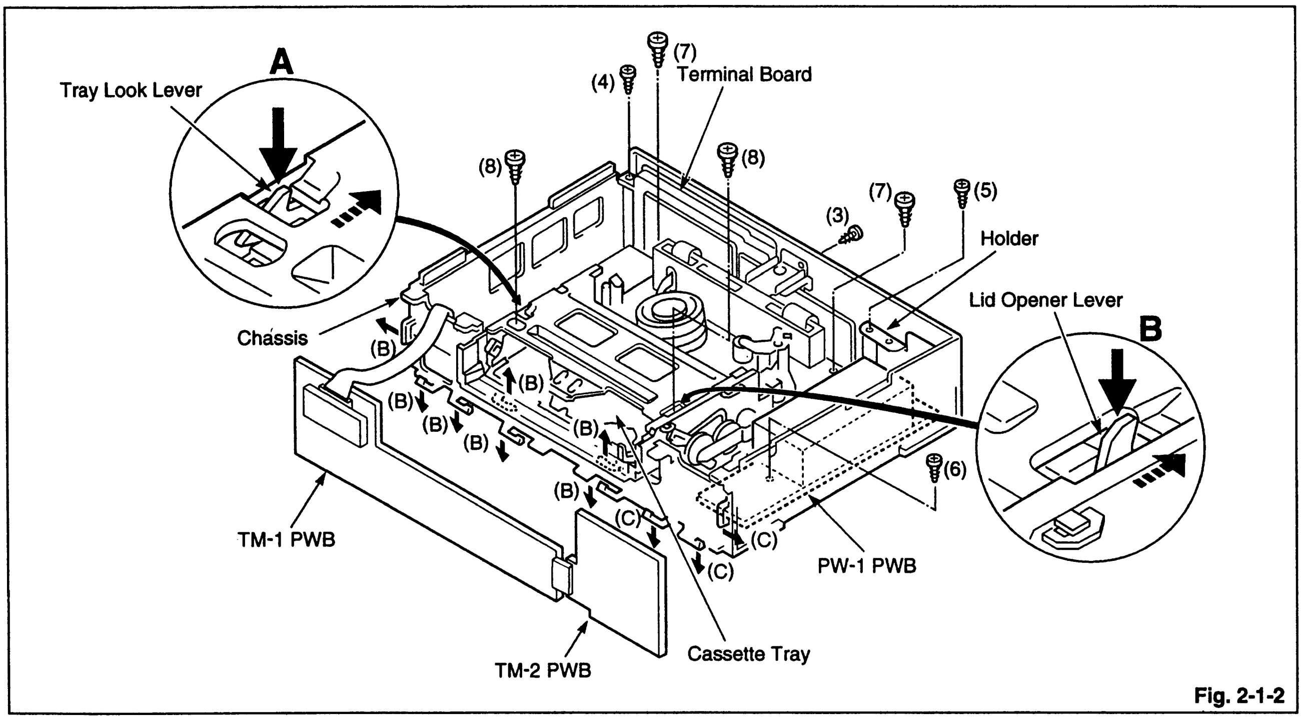

A
Tray Look Lever
(7)
(4)
Terminal Board
(8)
(8)
(7)
(5)
(3)
Holder
Lid Opener Lever
B
Chassis
(B)
(B)
(B)
(B)
(B)
(B)
(B)
(C)
(C)
(C)
(6)
TM-1 PWB
PW-1 PWB
TM-2 PWB
Cassette Tray

Fig. 2-1-2

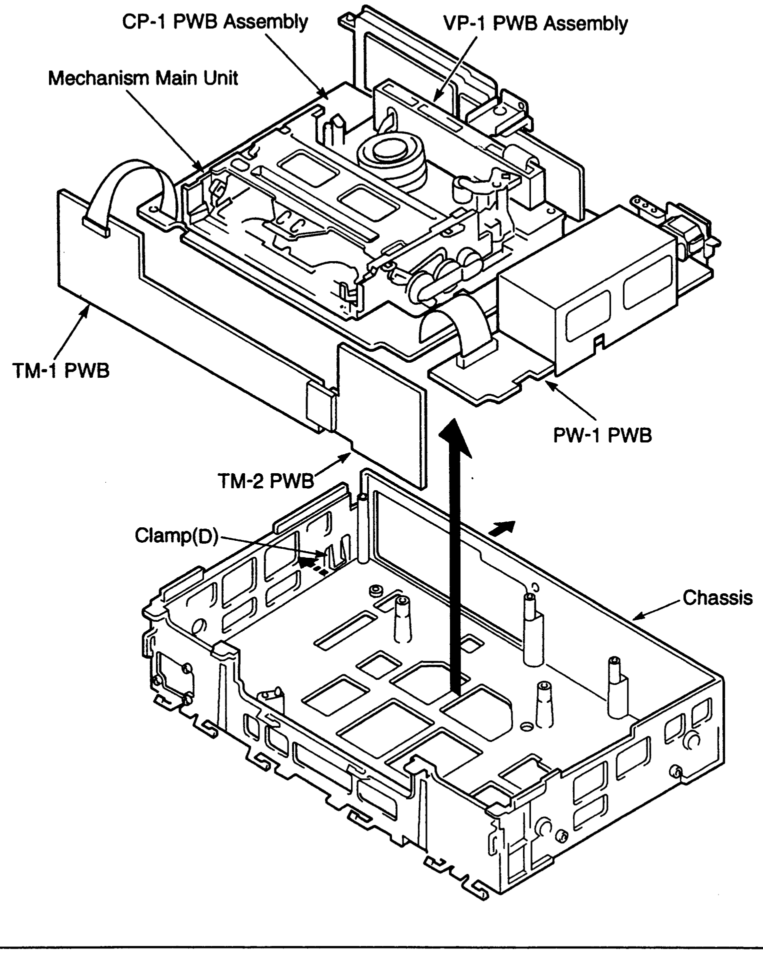

CP-1 PWB Assembly
VP-1 PWB Assembly
Mechanism Main Unit
TM-1 PWB
PW-1 PWB
TM-2 PWB
Clamp(D)
Chassis

Fig. 2-1-3

2-2. Temporarily Setting Up and Connecting CP-1 PWB Assembly

The following is an example of how to place and connect the main board without a jig, when repairing the CP-1 PWB assembly.

1. Place the mechanism unit and main board up side down as a whole on a flat surface with foil side of the main board facing up.
2. Operate the unit using the buttons on CP-1 PWB or the remote control.

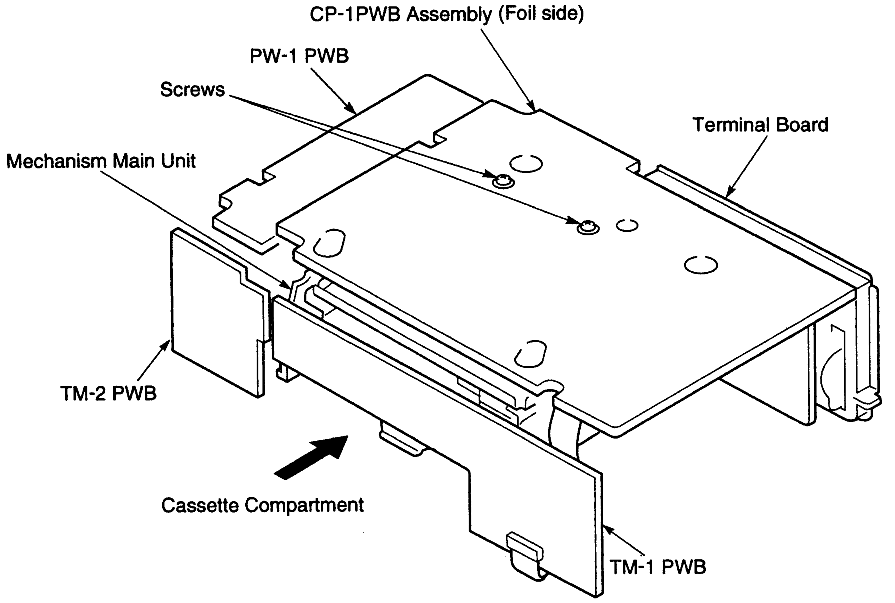

CP-1PWB Assembly (Foil side)
PW-1 PWB
Screws
Terminal Board
Mechanism Main Unit
TM-2 PWB
Cassette Compartment
TM-1 PWB

Fig. 2-2-1

2-3. Installation of the Front Panel

When installing the front panel to the chassis after repairs and adjustments.

1. Pressing down the door opener lever of the mechanism main unit.
2. Set the cassette door to half-opened state as shown in Fig. 2-3-1, and install the front panel to the chassis.

Note: Opened cassette door position does not install the front panel to the chassis.

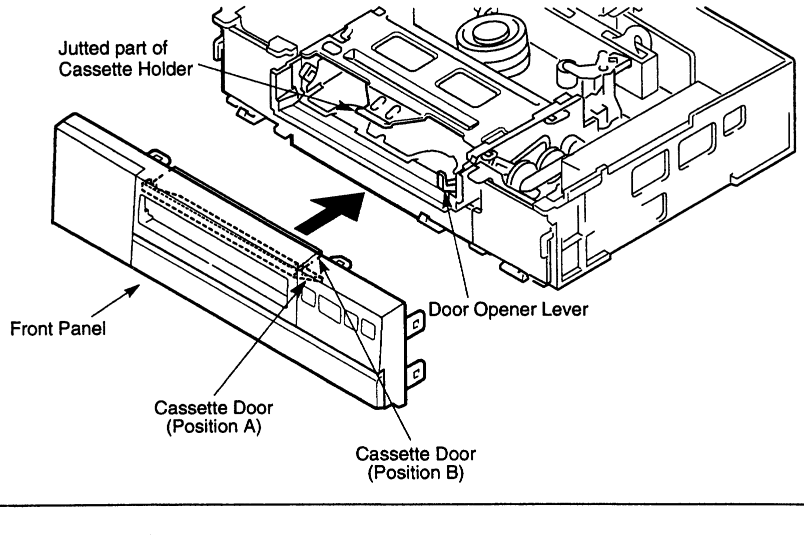

Jutted part of Cassette Holder
Front Panel
Door Opener Lever
Cassette Door (Position A)
Cassette Door (Position B)

Fig. 2-3-1

2-4. Circuit Board Locations

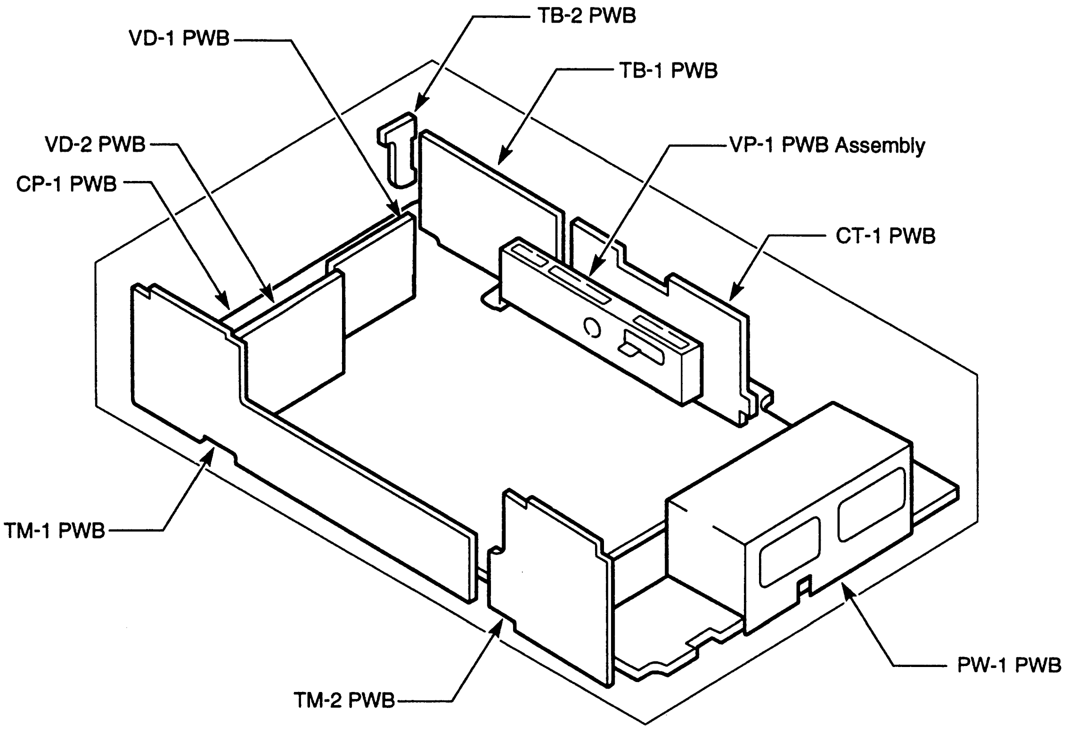
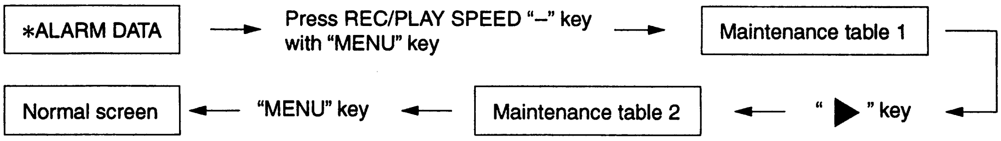

TB-2 PWB
VD-1 PWB
TB-1 PWB
VD-2 PWB
VP-1 PWB Assembly
CP-1 PWB
CT-1 PWB
TM-1 PWB
PW-1 PWB
TM-2 PWB

Fig. 2-4-1

2-5. Maintenance Table on the Monitor Screen

To display the maintenance table, press REC/PLAY SPEED "–" key with "MENU" key while the fourth MENU <ALARM TIME> is displayed.



Maintenance table 1

The used time of each mode (part) is displayed, and can be reset by items.

Access the maintenance-screen according to the above, and then Fig. below is displayed and VIDEO HEAD will blink.

Move the blinking to the item to be reset with "▼" key and press the "MENU RESET" key, and then the used time for the item will be reset.

```
        < MAINTENANCE TABLE 1 >
USED TIME RESET
*VIDEO HEAD              00000H
*POWER ON                00000H
*ALARM DATA              000000
```

When the "MENU RESET" key is pressed during display and resetting all data.

VIDEO HEAD: Used time of the video head (cylinder) total hours.
Note: Reset when the cylinder is replaced.
POWER ON: Hours of the power supply being.
ALARM DATA: Number of ALARM REC.
Total counts of ALARM.

Note: The data for the maintenance tables are memories in E^2 PROM, and the memory can be kept if the timer microcomputer is reset.

Maintenance table 2

As shown in Fig. below Maintenance Table 2, <ERROR> is displayed on the screen.

```
          < MAINTENANCE TABLE 2 >
ERROR
     DATA           CODE      POSITION
1    31 - 12 - 99   E01       08
2    --------       ---       --
3    --------       ---       --
4    --------       ---       --
5    --------       ---       --
6    --------       ---       --
7    --------       ---       --
8    --------       ---       --
```

When the "MENU RESET" key is pressed during display and resetting all data.

<ERROR> : Dates and error codes are displayed when VCR happens to be in an abnormal condition and the system is down.
The newest data is displayed in the first line, and the old ones are moved down one by one. Not-displayed old data is cleared automatically.

Error Codes Contents

Error Codes (Self-Diagnosis Contents)	
E01 → The cylinder motor does not rotate. E02 → The take-up reel does not rotate. E03 → The capstan motor does not rotate. E05 → The loading and unloading cannot be performed with the cassette inserted. (The tape guide is caught.) E06 → Front unloading cannot be performed when ejecting the cassette. (Front loading can be performed.) E07 → Front loading and front unloading cannot be performed when ejecting the cassette. E08 → The mechanism becomes 1 (BRAKE) while moving from 2 (STOP), 3 (PLAY), 4 (STILL/SLOW), and to 5 (REVERSE FRAME ADVANCE). (The mechanism mode switch contact is faulty.) E09 → The mechanism becomes 7 (INITIAL) while moving from1 (BRAKE), 2 (STOP), 3 (PLAY), 4 (STILL/SLOW), and to 5 (REVERSE FRAME ADVANCE). (The mechanism mode switch contact is faulty.)	E10 → The capstan motor does not rotate, or the capstan motor and the cylinder motor does not rotate with the cassette inserted. E11 → The cylinder motor does not rotate with the cassette inserted. E12 → The supply reel does the tape eject when tape unloading. E13 → The tape cannot be loaded with the cassette inserted. (But unloading can be performed.) E14 → The tape cannot be loaded normally. E15 → The mechanism does not move to the correct position after tape loading. E16 → Mechanism position “3” cannot be used during intermittent recording.

Mechanism Mode Display Contents

Mode. No.	Mechanism mode	Mode. No.	Mechanism mode	Mode. No.	Mechanism mode
00	CASSETTE OUT	09	REC	32	INTERMITTENT REC
01	STAND-BY	12	CUE	33	REVERSE STILL
02	STOP	13	REVIEW		
03	STILL	14	FAST FORWARD		
04	REC-PAUSE	15	REWIND		
06	FRAME ADVANCE	30	REVERSE PLAY		
08	PLAY	31	REVERSE FRAME ADVANCE		

Section 3
Mechanical Adjustments

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○ Cleaning ◎ Confirmation △ Lubrication □ Exchange

Part maintained		Parts No.	2000H	4000H	6000H	8000H	Remarks
Tape path system	ASSY, BRAKE BAND	3-963-789-01	◎	□	◎	□	
	ASSY, LEVER BT (tape guide)	3-691-016-01	○	○	○	○	
	FULL ERASE HEAD	3-193-669-01	○	○	○	□	
	ASSY, ROLLER CLEANER	3-977-103-01	◎	□	◎	□	
	ASSY, GUIDE ROLLER	3-735-630-01	○	○	○	○	
	ASSY, MOUNTING INCLNE S	3-961-037-01	○	○	○	□	
	ASSY, MOUNTING INCLNE T	3-961-039-01	○	○	○	□	
	ACE HEAD	A-8324-047-A	○	○	○	□	
	ASSY, LEVER PINCH ROLLER	3-961-024-01	○	□	○	□	
	MOUNT (ASSY), LIFT (JG)	3-204-110-01				□	
	CAM, LIFT PINCH	3-961-027-01				□	
	GEAR, CAM PINCH	3-203-303-01				□	
	ASSY, EARTH CYL	3-970-879-01		□		□	
	COMPL, CYLINDER	A-8311-844-A	○	○(□)	○	○(□)	
	ASSY, CYLINDER UPPER	3-200-194-01	○(□)	○(□)	○(□)	○(□)	
Reel drive system	ASSY, REEL SUPPLY	3-977-065-01	○△	○△	○△	○△	
	ASSY, REEL TAKEUP	3-963-782-01	○△	○△	○△	○△	
	GEAR, REEL S	3-960-927-01	△	△	△	△	
	GEAR, REEL T	3-960-928-01	△	△	△	△	
	PULLEY, REEL	3-960-926-01	△	△	△	△	
	SPECIAL, WASHER 2.4 X 6 X 2.5	3-948-603-01		◎		◎	
	COMPL, MOUNTING CLUTCH	A-8316-756-A	△	□	△	□	
	BELT, REEL	3-960-929-01	◎	□		□	
	MOTOR, CAPSTAN	3-203-331-01	○	◎(□)	◎(□)	□	
	ASSY, GEAR FRICTION	3-960-922-01	△	△□	△	△□	
Brake	ASSY, BRAKE S	3-963-785-01	◎	◎	◎	◎	
	ASSY, BRAKE T	3-963-786-01	◎	◎	◎	◎	
	ASSY, BRAKE CAPSTAN	A-8315-818-A	◎	◎	◎	◎	
	ASSY, BRAKE SOFT T	3-963-784-01		◎		□	
Loading drive system	ASSY, LOADING MOTOR	3-961-047-01		◎		□	
	DAMPER	3-961-049-01				□	
	COMPL, GEAR WORM	3-961-048-01		◎		□	
	CAM, MAIN	3-203-302-01				□	
	SPECIAL WASHER 3.6 X 0.5	3-973-491-01		◎		□	
	GEAR, WHEEL 1	3-961-050-01				□	
	GEAR, WHEEL 2	3-963-793-01		◎		□	
	MODE SWITCH	1-771-864-11		◎		□	
	SLIDE, CRECENT	3-203-305-01		◎		□	
	GEAR, LOAD S	3-960-995-01		◎		□	
	GEAR, RACK FRONT	3-961-305-01		◎		□	
	GEAR, RACK START	3-961-306-01		◎		□	
	GEAR, PINION	3-960-960-01		◎		□	
Performance check	BACK TENSION TORQUE		◎	◎	◎	◎	PB BACK TENSION TORQUE 25 ~ 50 g · cm
	FWD, REW TORQUE		◎	◎	◎	◎	FWD, REW TORQUE ≧ 600 g · cm
	PLAY TORQUE		◎	◎	◎	◎	PLAY 55 ~ 110 g · cm
	REV TORQUE		◎	◎	◎	◎	REV 100 ~ 210 g · cm

This periodic maintenance check table changes considerably according to the using conditions and environment.
Refer to POWER ON TIME, HEAD ON TIME for the length of time the unit has been used.
As life may be shortened if foreign particles and dusts remain accumulated on the tape guides and rotating and contacting portions, clean if dirty.
Dusts and other foreign particles on the tape guides may also shorten the tape life and lower picture quality, therefore clean thoroughly.

1-2. SERVICE TOOLS AND CLEANING

1-2-1. SERVICE TOOLS

NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.	Remarks
1	Alignment tape MH-2 (VHJ-0008) Alignment tape PAL HiFi 400Hz (VHJ-0009)	H-7099-052-H H-7099-175-H	PAL NORMAL PAL MONOSCOPE
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	Used to adjust the tape path
3	Nut box (VHJ-0048)	J-6082-045-A	Used to adjust the height of the lever load assembly
4	Torque gauge	H-7099-039-H	Used to measure reel winding torque
5	Torque gauge adapter	H-7099-035-H	
6	Cassette torque (VHJ-063S)	J-6082-011-A	Used to measure back tension torque
7	Load lever assembly height adjustment tool (VHJ-0111)	J-643-141-0A	Used to adjust the height of the load lever assembly
8	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	Used to adjust the tightening torque of screws
9	3 mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Used to replace the bit of the torque gauge screwdriver
10	Video head removing tool (VHJ-0041)	J-6082-049-A	Used to remove the upper cylinder
11	Oil (VHJ-0099)	7-661-018-18	————
12	Grease SGL-801 (VHJ-0100)	7-651-000-11	————
13	Grease EM-30LG (VHJ-0101)	J-6090-014-A	————
14	Relay cables (VHJ-0110)	J-643-142-0A	Relay cables of mechanism and CP-I PW8 assembly

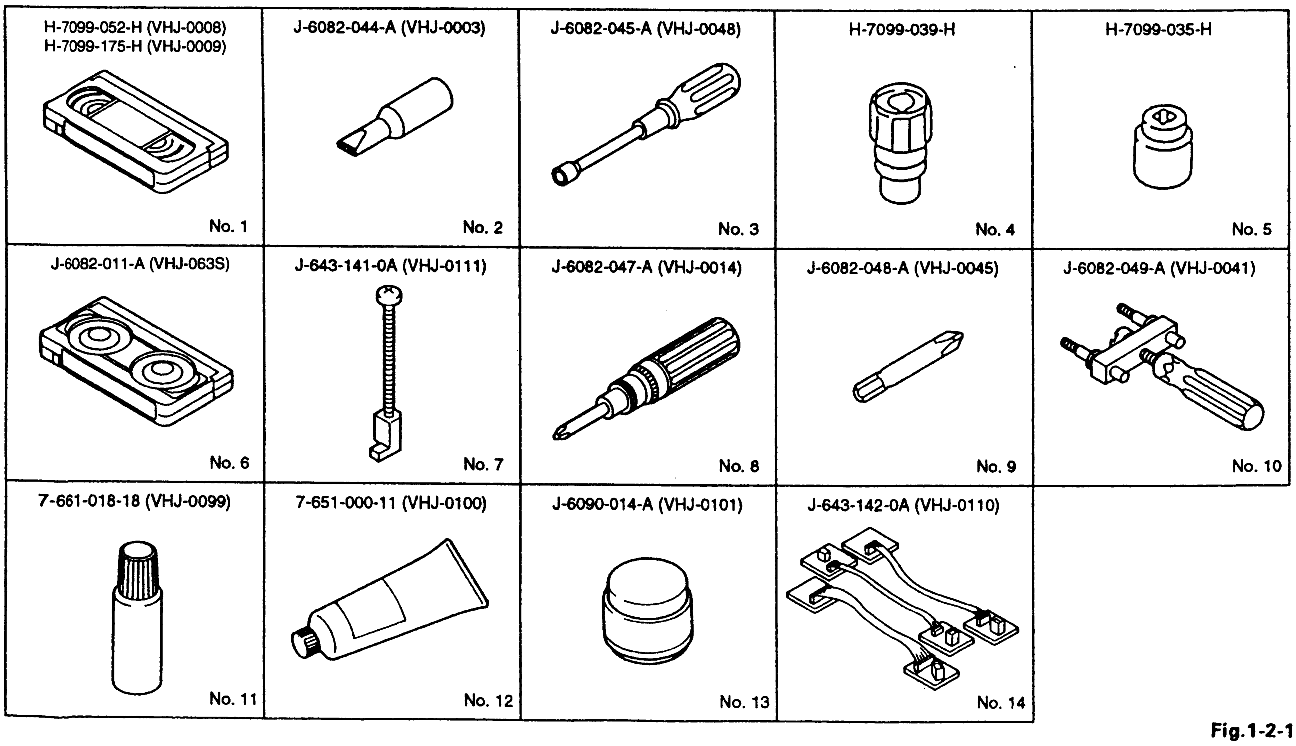

H-7099-052-H (VHJ-0008)
H-7099-175-H (VHJ-0009)
No. 1
J-6082-044-A (VHJ-0003)
No. 2
J-6082-045-A (VHJ-0048)
No. 3
H-7099-039-H
No. 4
H-7099-035-H
No. 5
J-6082-011-A (VHJ-063S)
No. 6
J-643-141-0A (VHJ-0111)
No. 7
J-6082-047-A (VHJ-0014)
No. 8
J-6082-048-A (VHJ-0045)
No. 9
J-6082-049-A (VHJ-0041)
No. 10
7-661-018-18 (VHJ-0099)
No. 11
7-651-000-11 (VHJ-0100)
No. 12
J-6090-014-A (VHJ-0101)
No. 13
J-643-142-0A (VHJ-0110)
No. 14

Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0110)

The mechanism can be repaired without using the relay cable (VHJ-0110). As shown in Fig. 1-2-2, the relay cable (VHJ-0110) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-2-2 when inserting/ejecting the cassette.

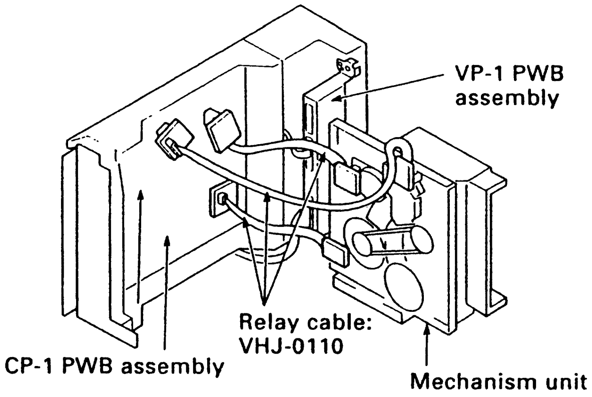

VP-1 PWB assembly
Relay cable: VHJ-0110
CP-1 PWB assembly
Mechanism unit

Fig. 1-2-2

1-2-3. CLEANING

1. Cylinder (Drum) (See Fig.1-2-3)

Moisten a chamois with methyl alcohol and clean the video head and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

NOTE: If the dirt on the tape guide cannot be cleaned off, replace the tape guide.

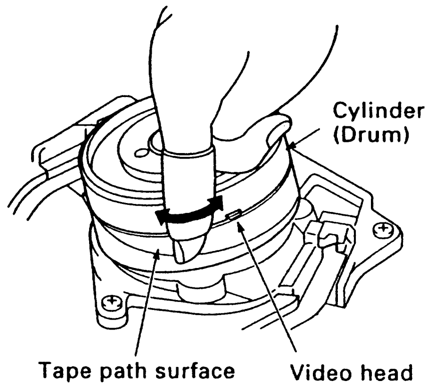

Cylinder (Drum)
Tape path surface
Video head

Fig.1-2-3

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

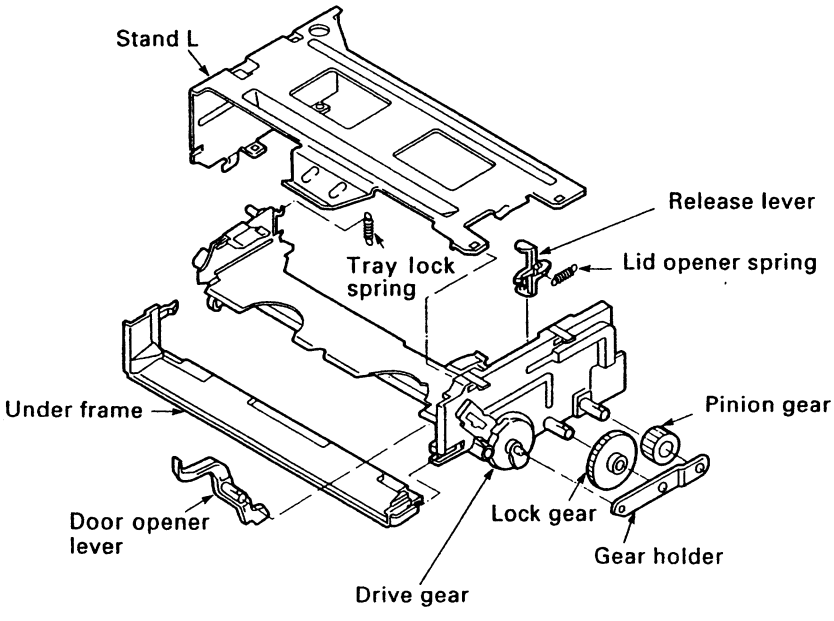
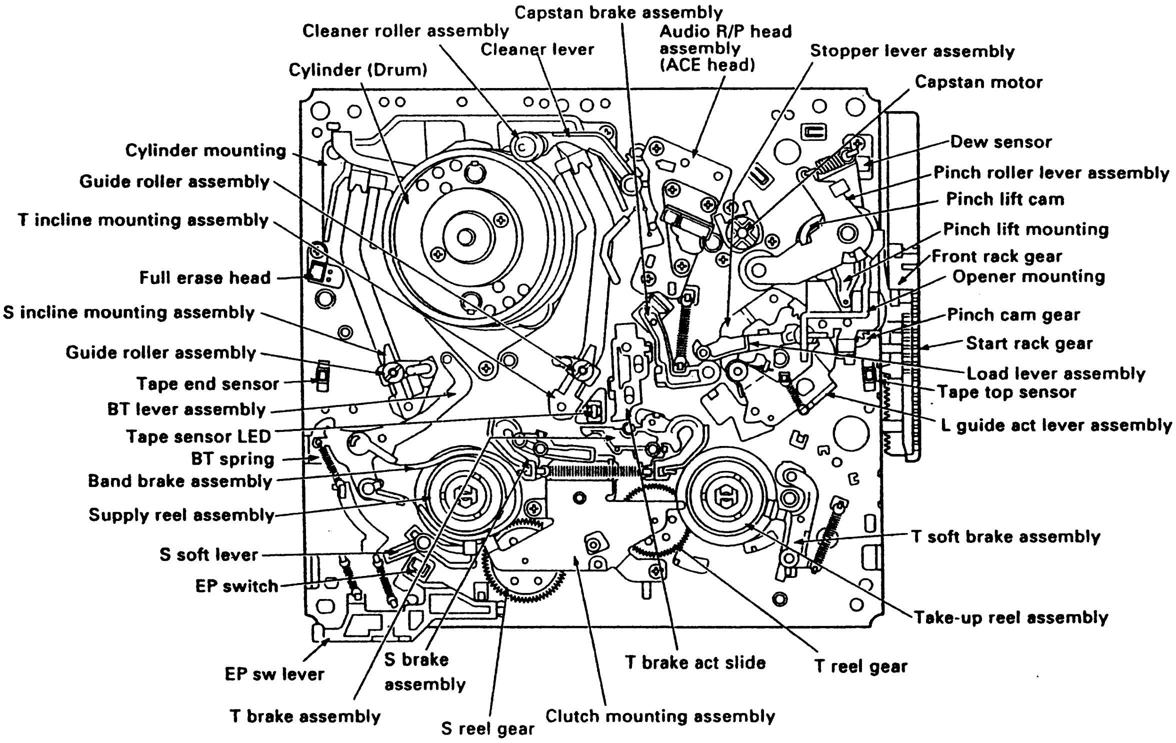

Stand L
Release lever
Tray lock spring
Lid opener spring
Pinion gear
Under frame
Door opener lever
Lock gear
Gear holder
Drive gear

Fig. 2-1-1

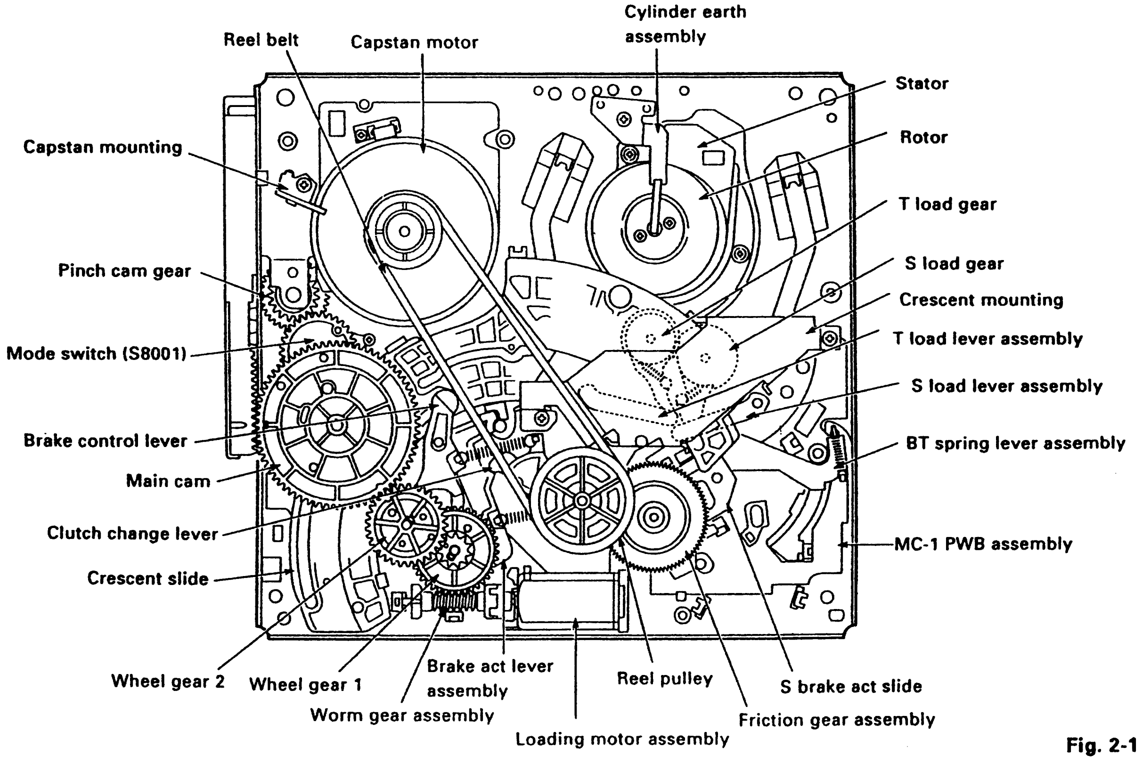
2-1-2. TOPVIEW



Capstan brake assembly
Cleaner roller assembly
Audio R/P head assembly (ACE head)
Cleaner lever
Stopper lever assembly
Cylinder (Drum)
Capstan motor
Cylinder mounting
Dew sensor
Guide roller assembly
Pinch roller lever assembly
Pinch lift cam
T incline mounting assembly
Pinch lift mounting
Front rack gear
Full erase head
Opener mounting
S incline mounting assembly
Pinch cam gear
Start rack gear
Guide roller assembly
Load lever assembly
Tape end sensor
Tape top sensor
BT lever assembly
L guide act lever assembly
Tape sensor LED
BT spring
Band brake assembly
Supply reel assembly
T soft brake assembly
S soft lever
EP switch
Take-up reel assembly
EP sw lever
S brake assembly
T brake act slide
T reel gear
T brake assembly
S reel gear
Clutch mounting assembly

Fig. 2-1-2

2-1-3. UNDERSIDE



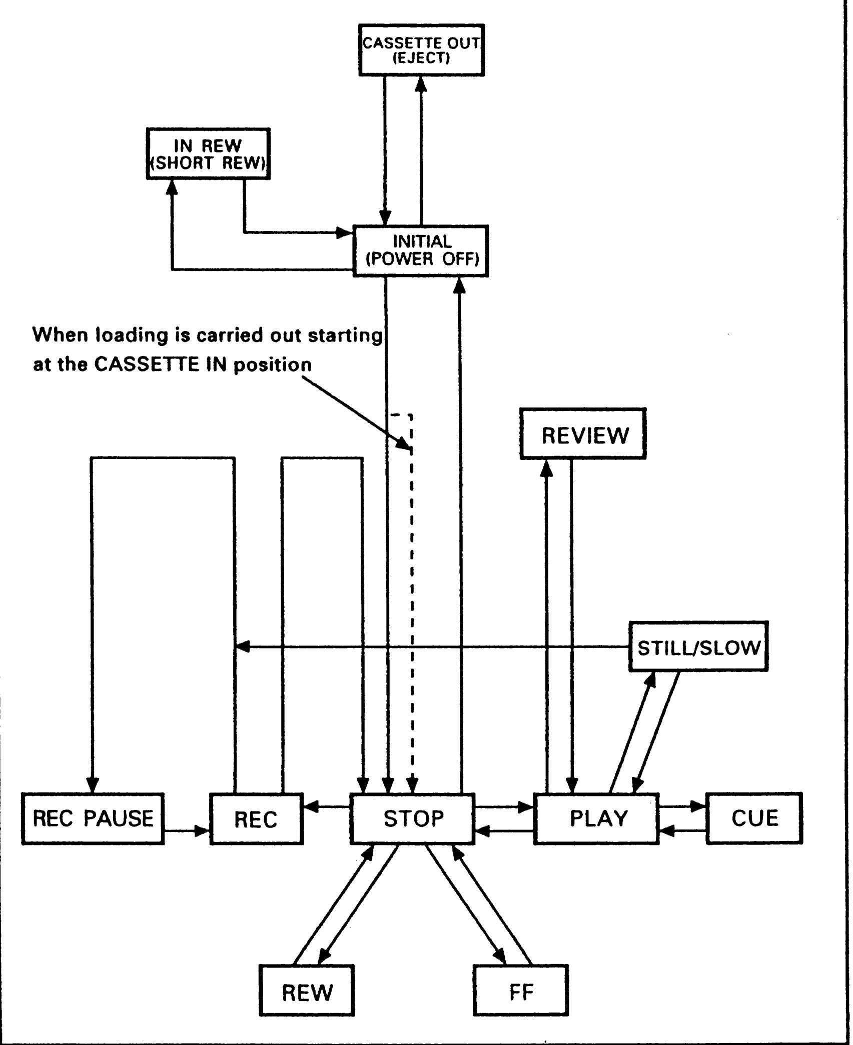
Reel belt
Capstan motor
Cylinder earth assembly
Stator
Capstan mounting
Rotor
T load gear
Pinch cam gear
S load gear
Crescent mounting
Mode switch (S8001)
T load lever assembly
S load lever assembly
Brake control lever
BT spring lever assembly
Main cam
Clutch change lever
MC-1 PWB assembly
Crescent slide
Wheel gear 2
Wheel gear 1
Brake act lever assembly
Reel pulley
S brake act slide
Worm gear assembly
Friction gear assembly
Loading motor assembly

Fig. 2-1-3

2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode	The principal mode-switching states of the mechanism
6	EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.	 CASSETTE OUT (EJECT) IN REW (SHORT REW) INITIAL (POWER OFF) When loading is carried out starting at the CASSETTE IN position REVIEW STILL/SLOW REC PAUSE REC STOP PLAY CUE REW FF
2	IN REW Ⓡ	
0		
7	INITIAL ⑦	
0	Cleaner roller assembly: ON	
1	S/T mounting incline assembly pressure begins.	
0	S/T mounting incline assembly pressure ends.	
1	REVIEW ①	
0		
2	IDLER pos. ② (Pinch roller OFF)	
0		
3	STILL/SLOW ③	
0		
5	PLAY/STOP ⑤	
0		
4	BRAKE pos. ④	
0		
6	FF/REW ⑥	

MODE SWITCH OUTPUT TABLE

HEX DATA	X	Y	Z
0	H	H	H
1	H	H	L
2	H	L	H
3	H	L	L
4	L	H	H
5	L	H	L
6	L	L	H
7	L	L	L

X: SW DATA 2
Y: SW DATA 1
Z: SW DATA 0

H: 5V
L: 0V
Low active

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

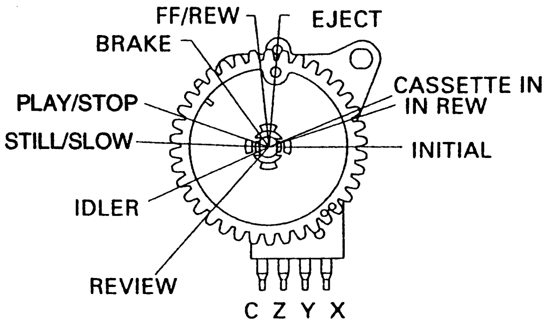

FF/REW
EJECT
BRAKE
CASSETTE IN
IN REW
PLAY/STOP
STILL/SLOW
INITIAL
IDLER
REVIEW
C Z Y X

Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Mechanism mode / Principal parts	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/ DOWN	DOWN/ UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting. Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

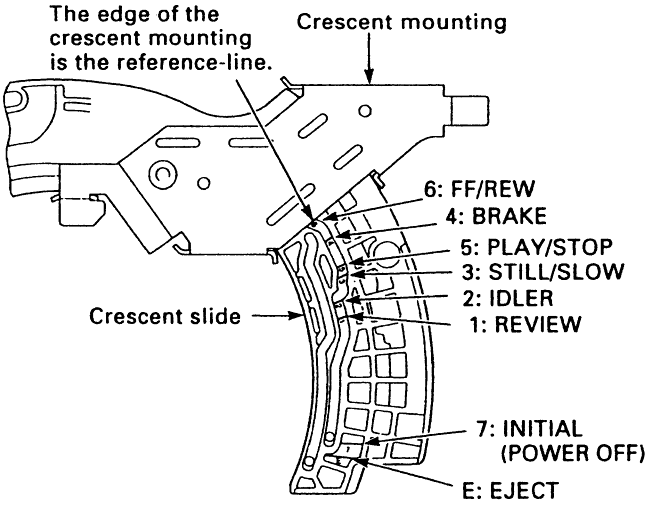


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.
Use it as a means of finding out the symptoms and cause of the error before performing repairs.
For details, refer to the separate service manual for the respective models.

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of disassembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-2.

3-1-1. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-1)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

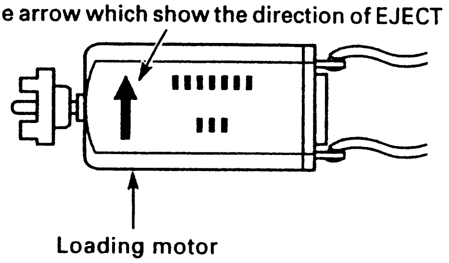


Fig.3-1-1

3-1-2. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) If you turn the main cam counterclockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

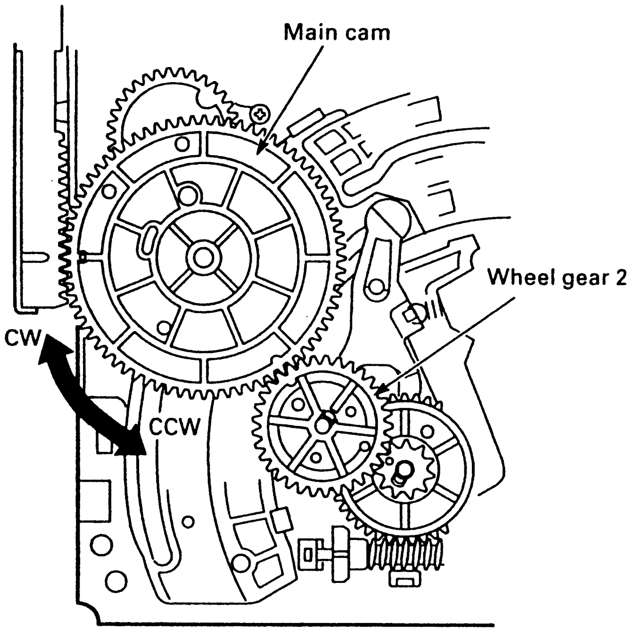


Fig.3-1-2

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ②.
3) Unplug the dew sensor connector ⑩.
4) Remove the two screws ③, then remove the VM-1/VP-1 PWB assembly ④, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly varies according to the model.
5) Remove the two screws ⑤ and the two screws ⑥, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑤ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

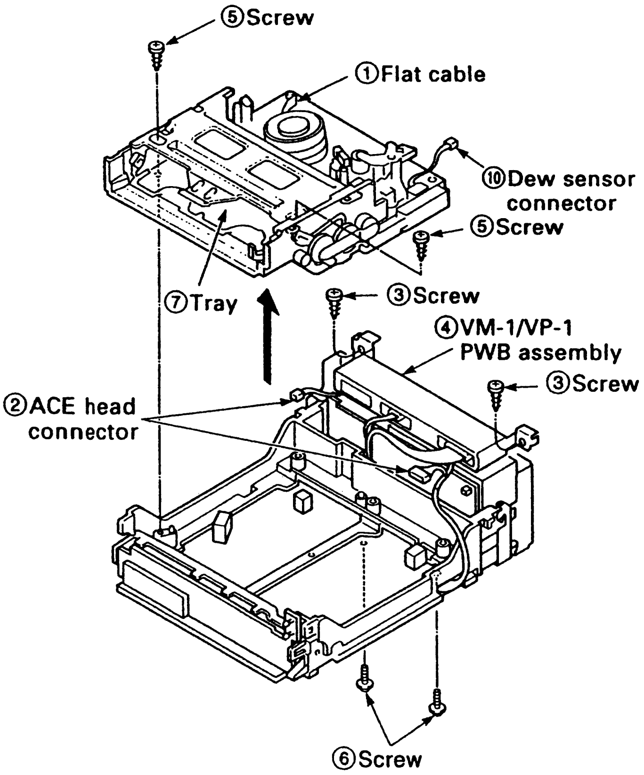

⑤Screw
①Flat cable
⑩Dew sensor connector
⑤Screw
⑦Tray
③Screw
④VM-1/VP-1 PWB assembly
③Screw
②ACE head connector
⑥Screw

Fig.3-2-1

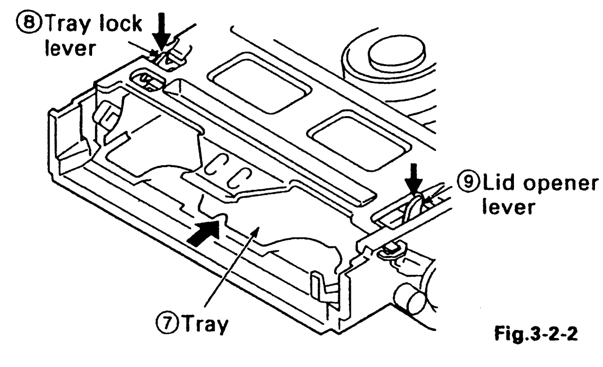

⑧Tray lock lever
⑨Lid opener lever
⑦Tray

Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

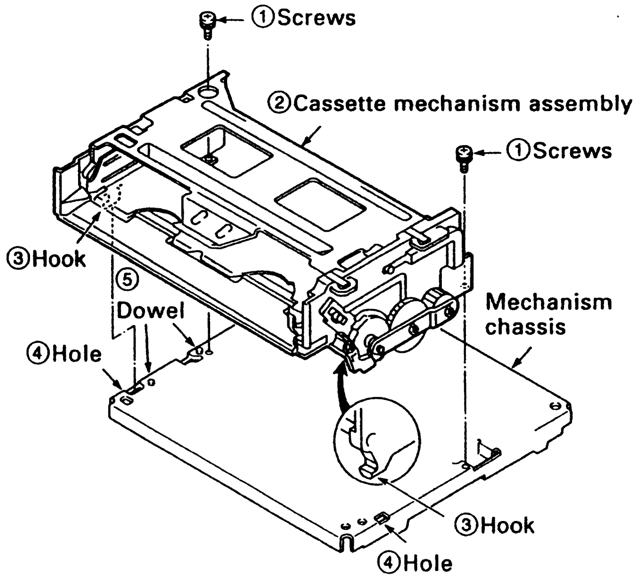

①Screws
②Cassette mechanism assembly
①Screws
③Hook
⑤ Dowel
④Hole
Mechanism chassis
③Hook
④Hole

Fig.3-3-1

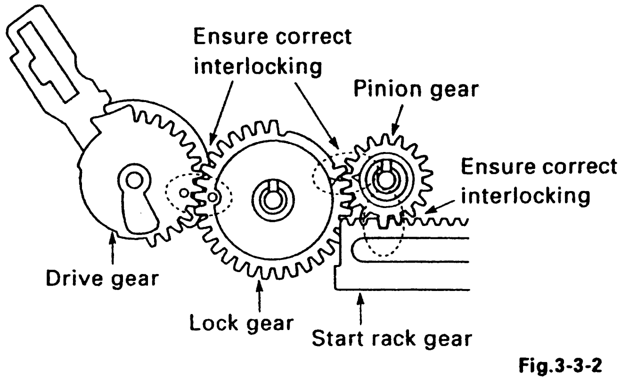

Ensure correct interlocking
Pinion gear
Ensure correct interlocking
Drive gear
Lock gear
Start rack gear

Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

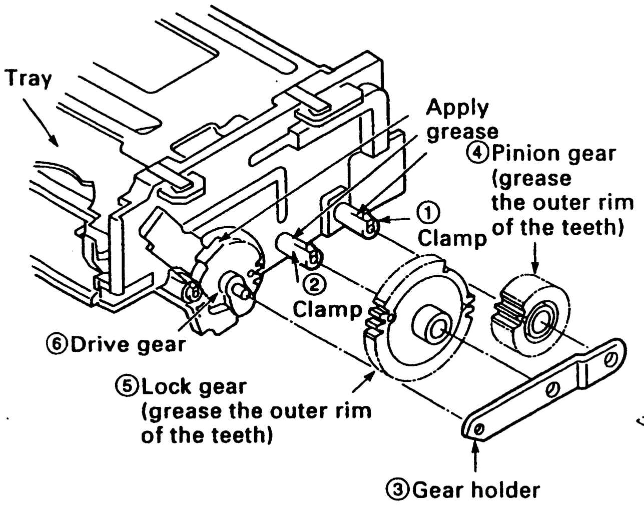

Tray
Apply grease
④Pinion gear (grease the outer rim of the teeth)
① Clamp
② Clamp
⑥Drive gear
⑤Lock gear (grease the outer rim of the teeth)
③Gear holder

Fig.3-3-3

3-3-3. DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

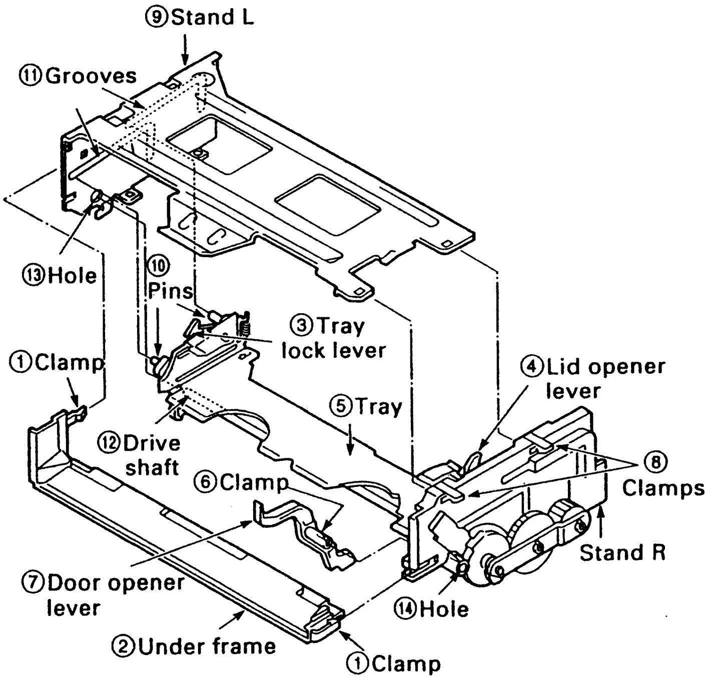

⑨Stand L
⑪Grooves
⑬Hole
⑩ Pins
③Tray lock lever
①Clamp
⑤Tray
④Lid opener lever
⑧ Clamps
⑫Drive shaft
⑥Clamp
Stand R
⑦Door opener lever
⑭Hole
②Under frame
①Clamp

Fig.3-3-4

3-3-4. START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

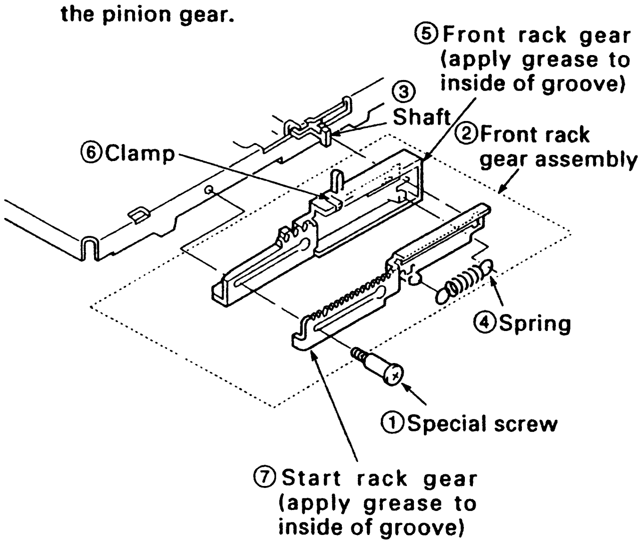

⑤Front rack gear (apply grease to inside of groove)
③ Shaft
②Front rack gear assembly
⑥Clamp
④Spring
①Special screw
⑦Start rack gear (apply grease to inside of groove)

Fig.3-3-5

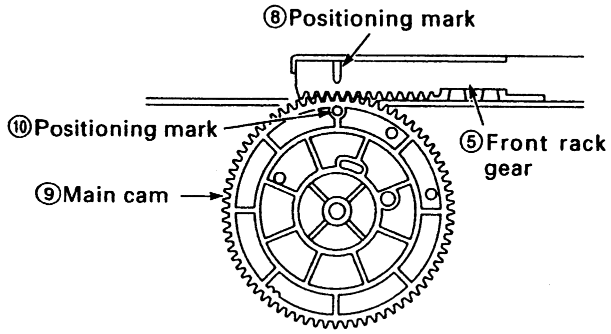

⑧Positioning mark
⑩Positioning mark
⑤Front rack gear
⑨Main cam

Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑon the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

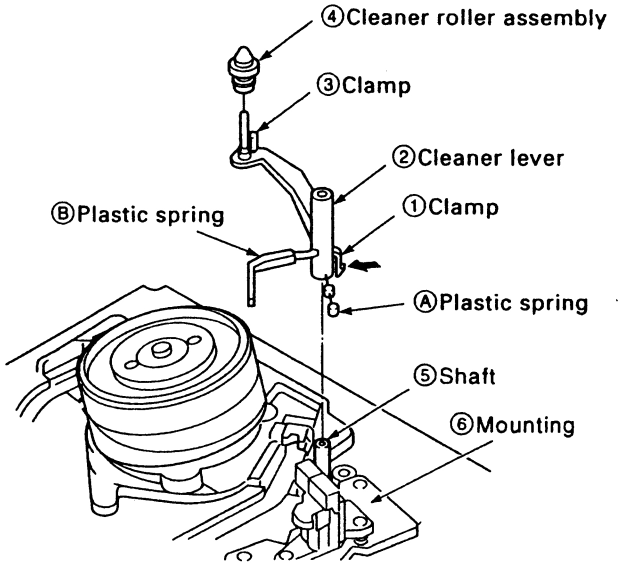

④Cleaner roller assembly
③Clamp
②Cleaner lever
ⒷPlastic spring
①Clamp
ⒶPlastic spring
⑤Shaft
⑥Mounting

Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM)
(See Figs. 3-5-1, 3-5-2, 3-5-3,3-5-4)

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle ② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

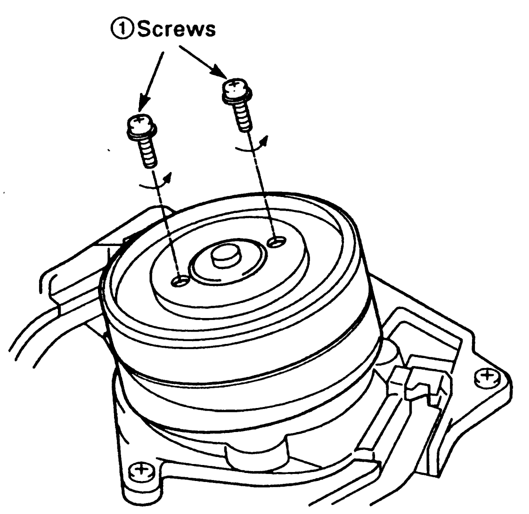


Fig.3-5-1

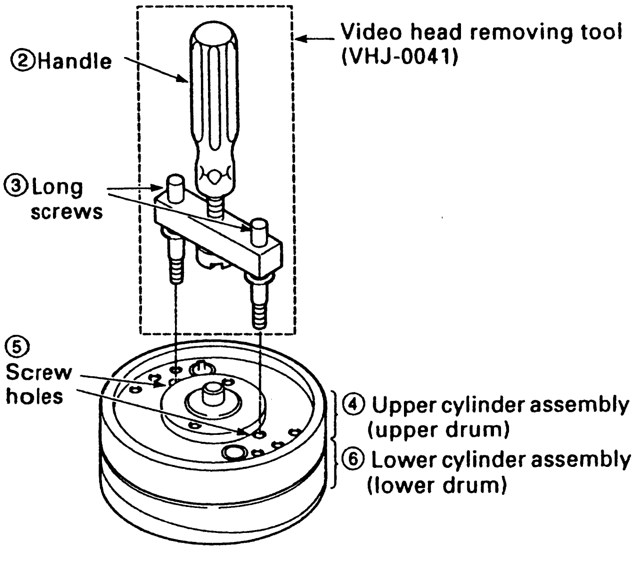

②Handle
Video head removing tool (VHJ-0041)
③Long screws
⑤ Screw holes
④ Upper cylinder assembly (upper drum)
⑥ Lower cylinder assembly (lower drum)

Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N4N-Q, 2N4P-QO, 2N4N-QL, 2N4P-QL, 2N4N-SQ, 2N4P-SQ...etc, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

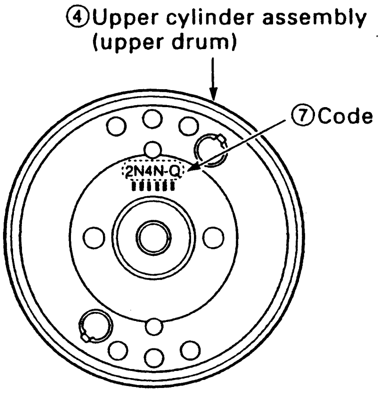

④Upper cylinder assembly (upper drum)
⑦Code
2N4N-Q

Fig.3-5-3

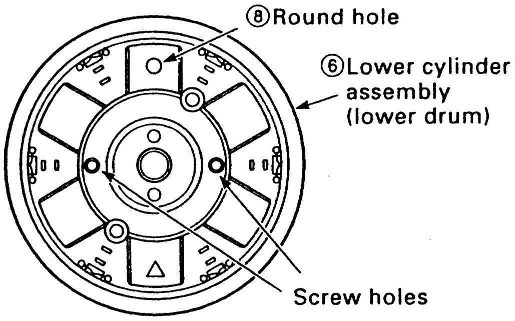

⑧Round hole
⑥Lower cylinder assembly (lower drum)
Screw holes

Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the three screws ①. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the cylinder mounting ② slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ② (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ③ on the mounting cylinder ② with the two holes ④ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-5-2 and remove the cylinder unit.
2) If you have removed the mechanism unit, remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑤.
4) Remove the three screws ⑥ and the stator ⑦.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑧ - beside the triangular mark on the rotor ④ - with the hole ⑨ in the rotor disk.
2. When fitting the screws ③ and ⑥, use the torque gauge screwdriver (VHJ-0014). give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑩ on the cylinder earth assembly ② with the holes ⑪ in the chassis.
4. If you have removed the cylinder unit, after assembly, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

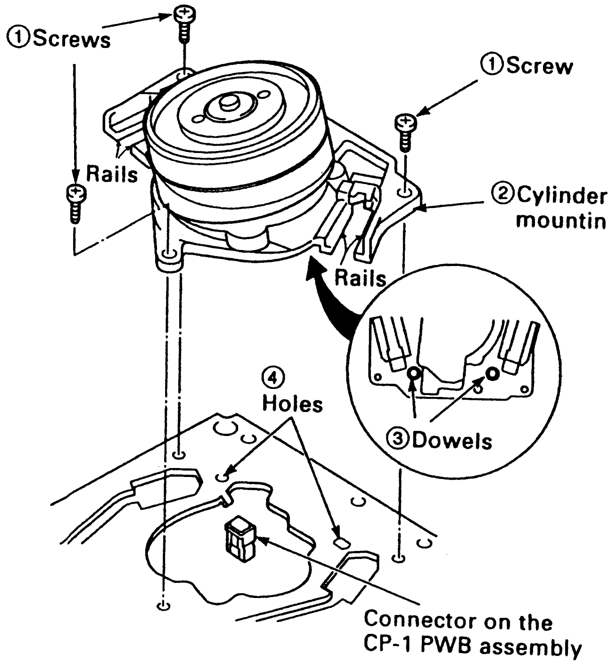

①Screws
①Screw
Rails
②Cylinder mounting
Rails
④ Holes
③Dowels
Connector on the CP-1 PWB assembly

Fig.3-5-5

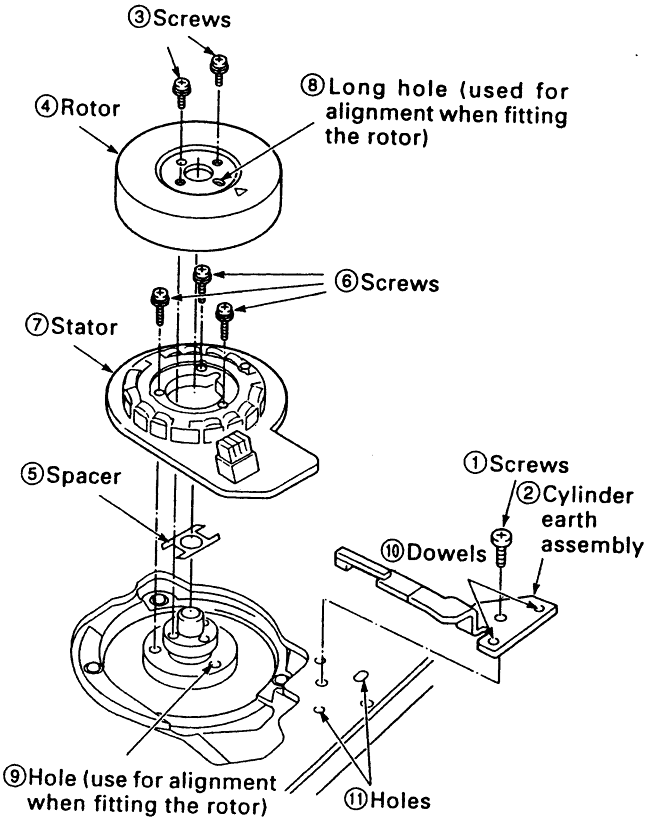

③Screws
④Rotor
⑧Long hole (used for alignment when fitting the rotor)
⑥Screws
⑦Stator
⑤Spacer
①Screws
②Cylinder earth assembly
⑩Dowels
⑨Hole (use for alignment when fitting the rotor)
⑪Holes

Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-2 and 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the cylinder mounting ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

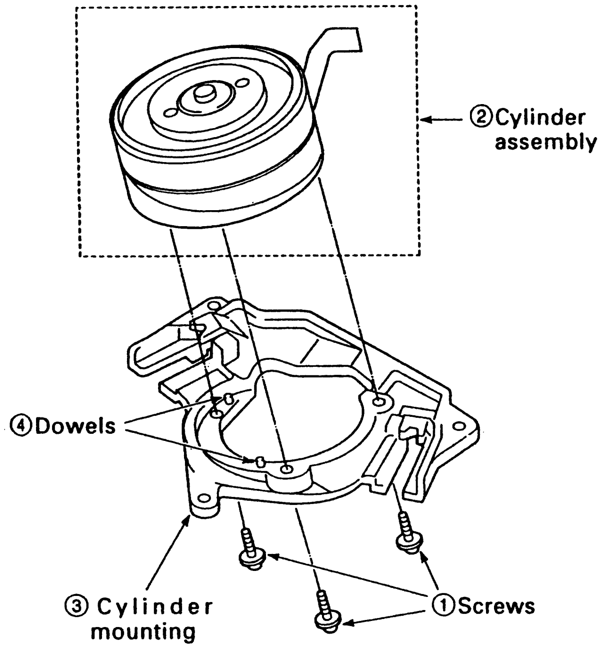


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ①, then remove the audio R/P head assembly (ACE head) ②and the washer ③.

ASSEMBLY NOTES:

1. Align the hole ④ on the audio R/P head assembly (ACE head) with the pin ⑤ on the chassis unit.
2. After assembly, check that the clamp ⑥ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

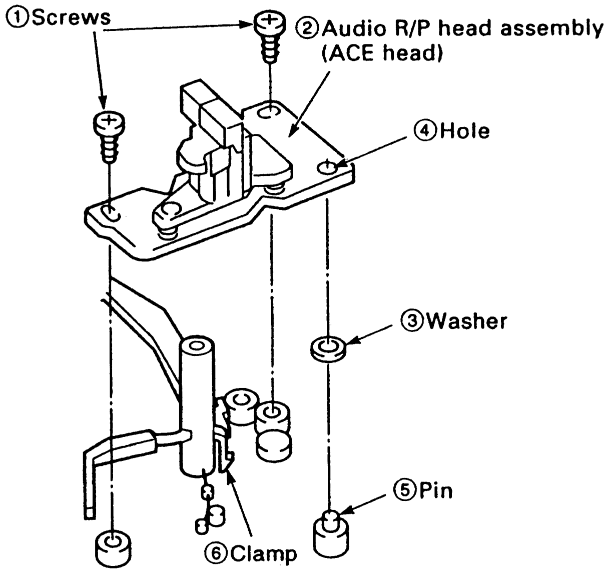


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

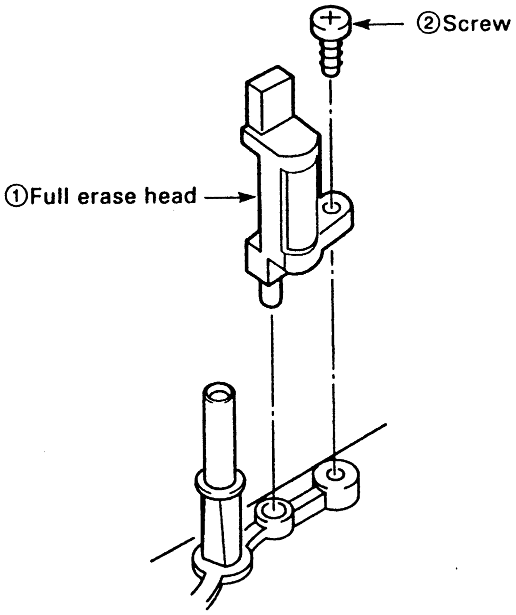


Fig.3-6-2

3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the screw ①, then remove the capstan mounting ②.
3) Remove the reel belt ③.
4) Remove the three screws ④ and the capstan motor ⑤.

ASSEMBLY NOTES:

1. Check that connector ⑥ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ④, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

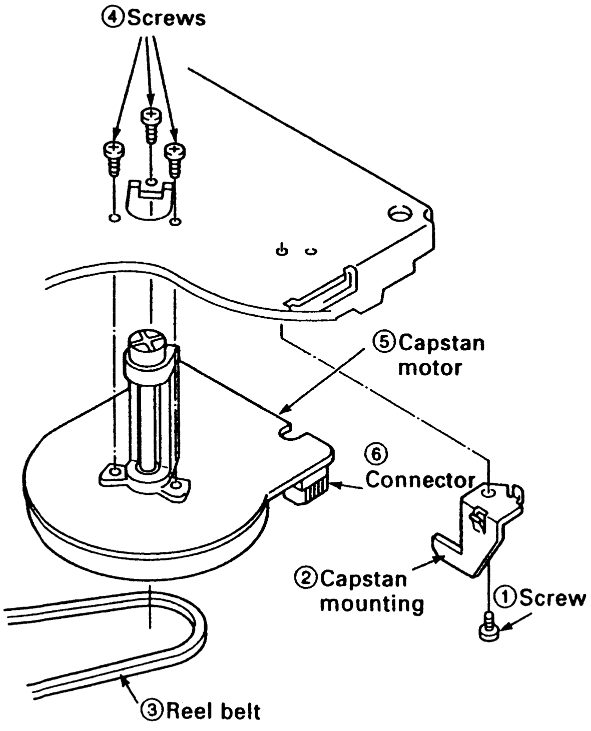

④Screws
⑤Capstan motor
⑥ Connector
②Capstan mounting
①Screw
③Reel belt

Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.

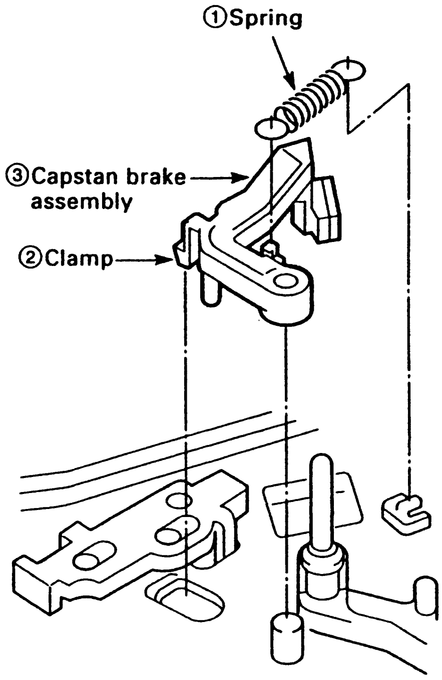

①Spring
③Capstan brake assembly
②Clamp

Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires ② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp ③, and remove the loading motor assembly ① and the damper ④. Be careful not to exert too much force on the clamp ③.
4) Remove the worm gear assembly ⑤. To maintain performance, do not dis-assemble the worm gear assembly ⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps ③ and ⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires ② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires ②, adjust them so that they do not touch the friction gear assembly.

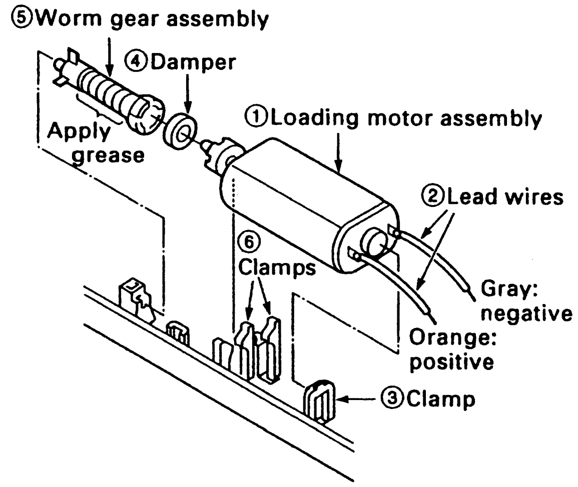

⑤Worm gear assembly
④Damper
Apply grease
①Loading motor assembly
②Lead wires
⑥ Clamps
Gray: negative
Orange: positive
③Clamp

Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting ②.
2) Remove the spring ③, then remove the pinch roller lever assembly ④ off the pinch lift mounting ②. Before you do this, align the Indentation ⑤ on the pinch roller lever assembly ④ with the clamp ⑥ on the pinch lift mounting ②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

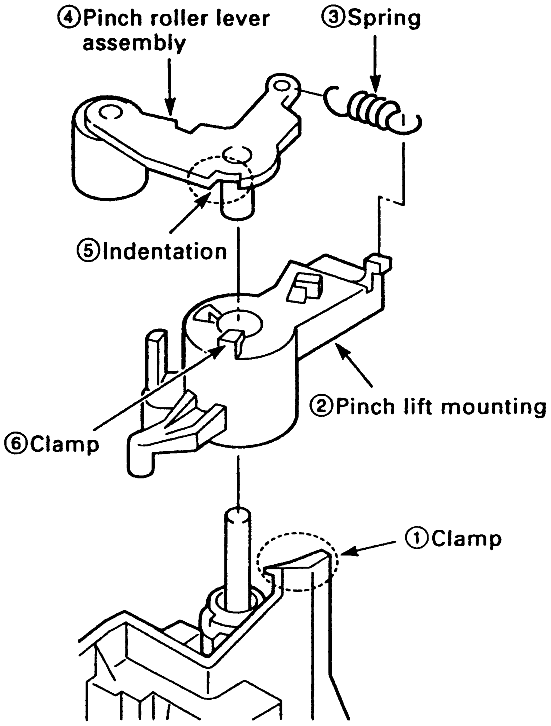

④Pinch roller lever assembly
③Spring
⑤Indentation
②Pinch lift mounting
⑥Clamp
①Clamp

Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft ⑧ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

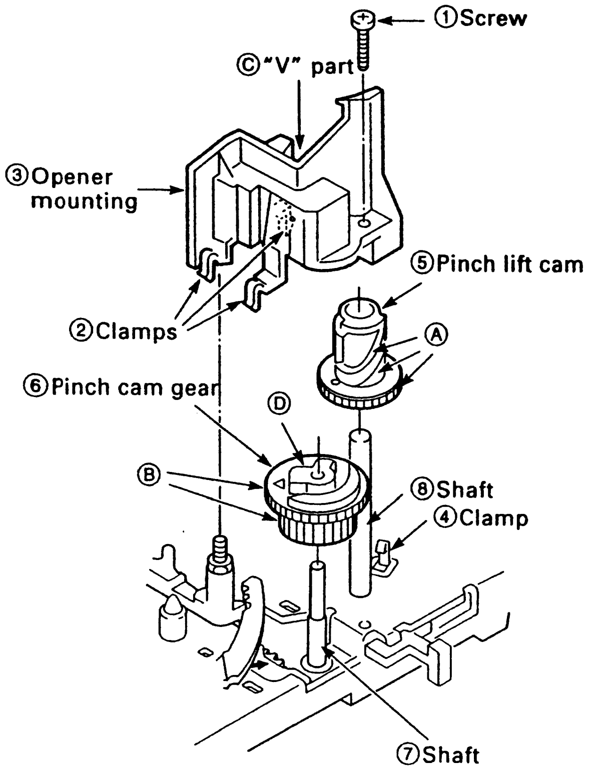

①Screw
Ⓒ"V" part
③Opener mounting
⑤Pinch lift cam
Ⓐ
②Clamps
⑥Pinch cam gear
Ⓓ
Ⓑ
⑧Shaft
④Clamp
⑦Shaft

Fig.3-9-2

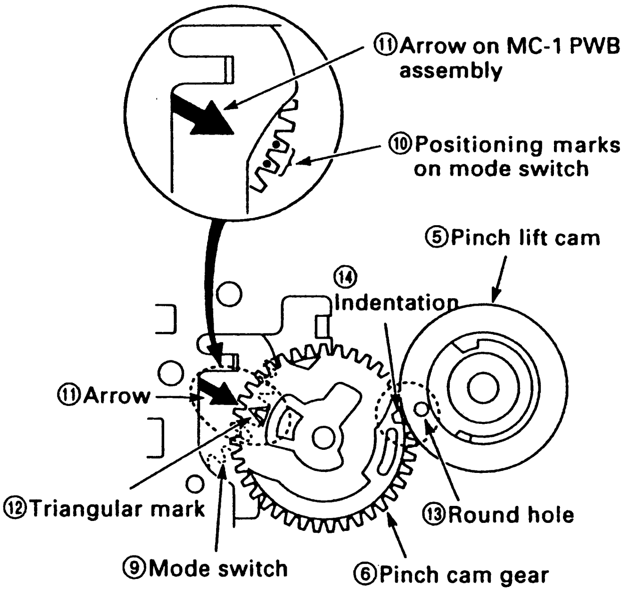

⑪Arrow on MC-1 PWB assembly
⑩Positioning marks on mode switch
⑤Pinch lift cam
⑭ Indentation
⑪Arrow
⑫Triangular mark
⑬Round hole
⑨Mode switch
⑥Pinch cam gear

Fig.3-9-3

3-10. L GUIDE ACT LEVER ASSEMBLY, LOAD LEVER ASSEMBLY AND STOPPER LEVER ASSEMBLY

(See Fig.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2 ,then remove the pinch roller lever assembly and the opener mounting.
3) Remove the stopper spring ①.
4) After removing the washer ②, remove the L guide act spring ③ and the L guide act lever assembly ④.
5) Remove the special nut ⑤, then remove the load lever assembly ⑥ and the L guide lever spring ⑦.
6) Remove the stopper lever assembly ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ④ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑦ into the stopper ⑪ and the load lever assembly ⑥ shown in Fig. A.
4) Put the pin ⑫ of the L guide act lever assembly into the cam groove ⑬ of the crescent slide.

3-11. BT LEVER ASSEMBLY

(See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①, and remove the sub BT spring ② on the underside of mechanism chassis.
4) Remove the clamp ③ on the underside of the mechanism chassis, then remove the BT lever assembly ④.
5) Remove the clamp ⑤ on the band brake assembly ⑥. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ④ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ④, be careful not to bend the stopper ⑦ or the S incline mounting assembly ⑧ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ④, as shown in Fig. B.
4. After assembly, make sure that the mountings on both ends of the band brake assembly ⑥ are positioned as shown in Fig. C.
5. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

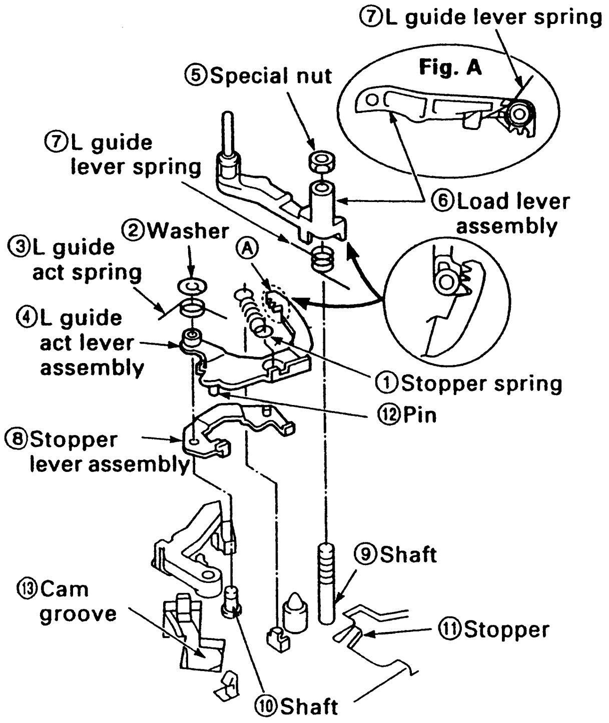

⑦L guide lever spring
Fig. A
⑤Special nut
⑦L guide lever spring
⑥Load lever assembly
②Washer
Ⓐ
③L guide act spring
④L guide act lever assembly
①Stopper spring
⑫Pin
⑧Stopper lever assembly
⑨Shaft
⑬Cam groove
⑪Stopper
⑩Shaft

Fig.3-10-1

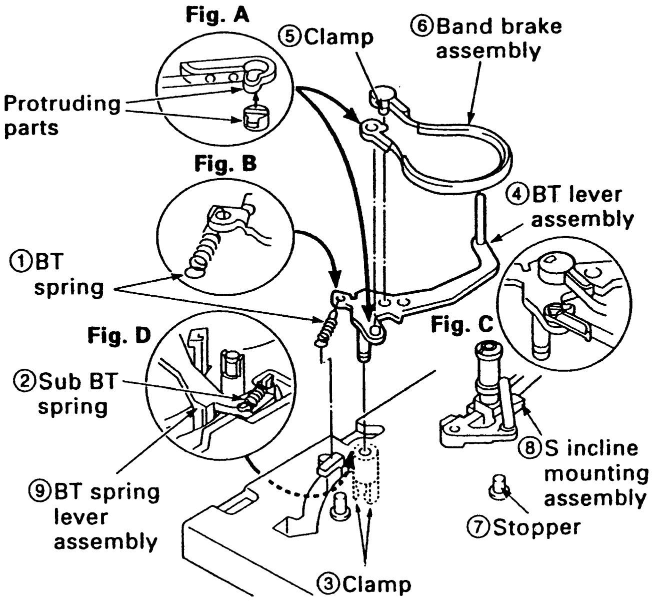


Fig. A
⑤Clamp
⑥Band brake assembly
Protruding parts
Fig. B
④BT lever assembly
①BT spring
Fig. C
Fig. D
②Sub BT spring
⑧S incline mounting assembly
⑨BT spring lever assembly
⑦Stopper
③Clamp

Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1. REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

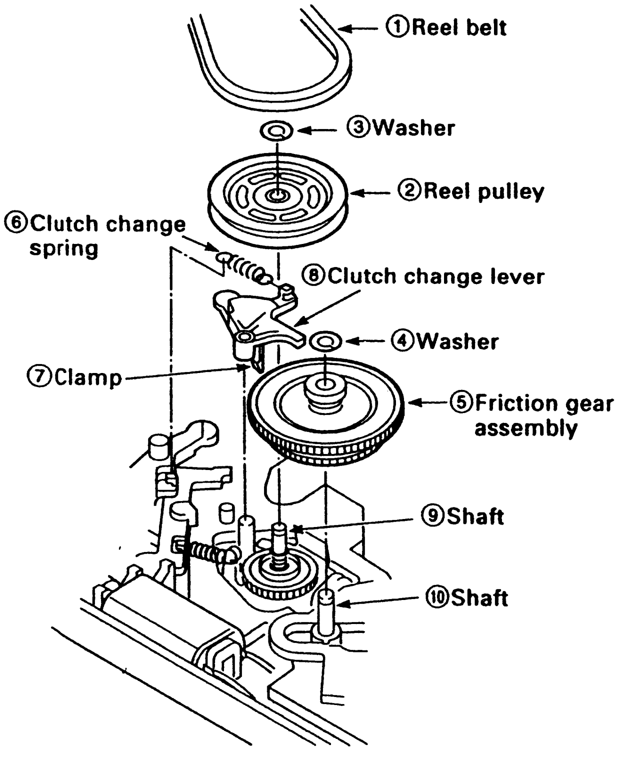

①Reel belt
③Washer
②Reel pulley
⑥Clutch change spring
⑧Clutch change lever
④Washer
⑦Clamp
⑤Friction gear assembly
⑨Shaft
⑩Shaft

Fig.3-12-1

3-12-2. CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

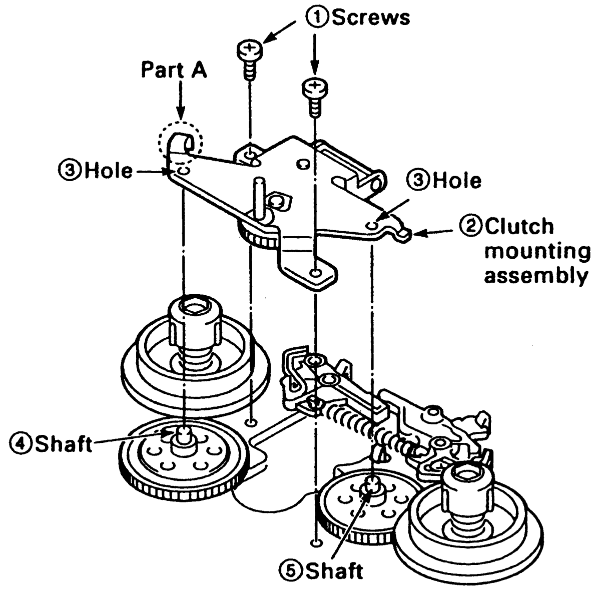

①Screws
Part A
③Hole
③Hole
②Clutch mounting assembly
④Shaft
⑤Shaft

Fig.3-12-2

3-12-3. S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

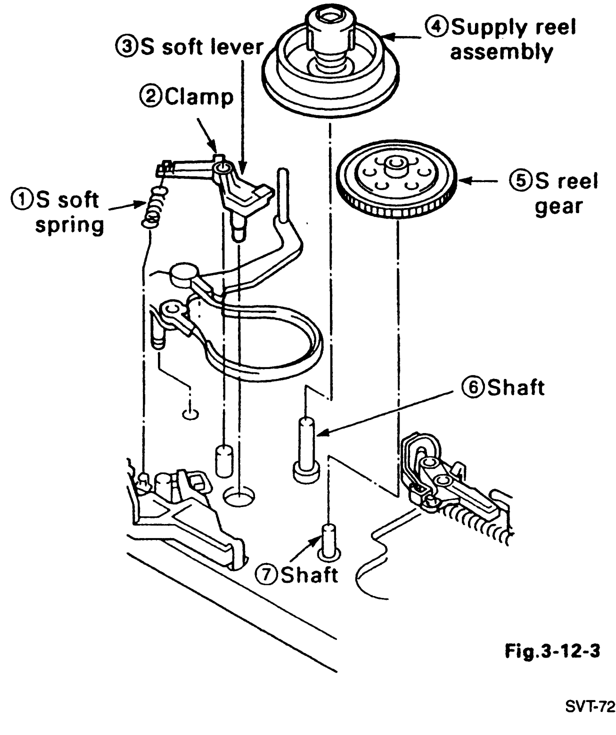

③S soft lever
④Supply reel assembly
②Clamp
⑤S reel gear
①S soft spring
⑥Shaft
⑦Shaft

Fig.3-12-3

3-12-4.T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ②, then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

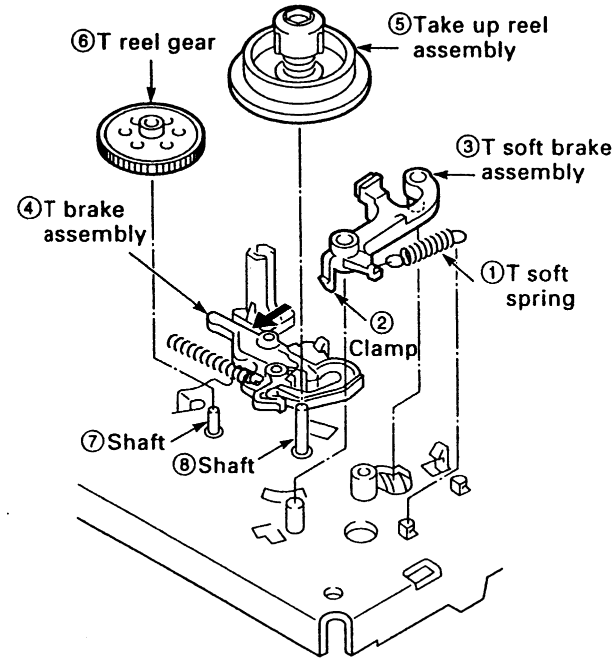

⑥T reel gear
⑤Take up reel assembly
③T soft brake assembly
④T brake assembly
①T soft spring
②
Clamp
⑦Shaft
⑧Shaft

Fig.3-12-4

3-13. BRAKES

3-13-1.S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

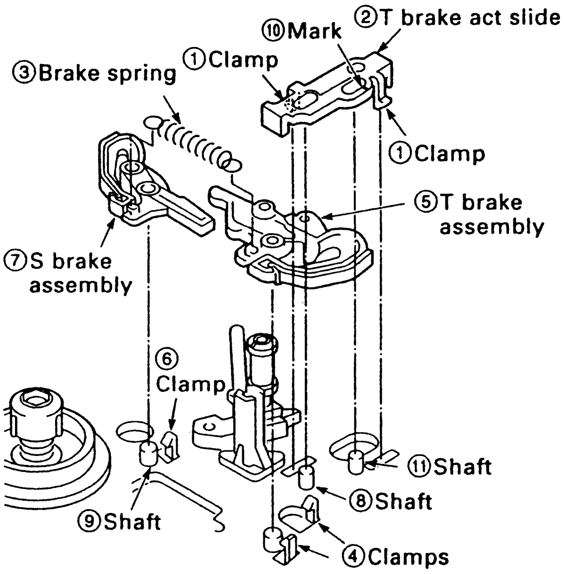

⑩Mark
②T brake act slide
③Brake spring
①Clamp
①Clamp
⑤T brake assembly
⑦S brake assembly
⑥
Clamp
⑪Shaft
⑧Shaft
⑨Shaft
④Clamps

Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑫ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

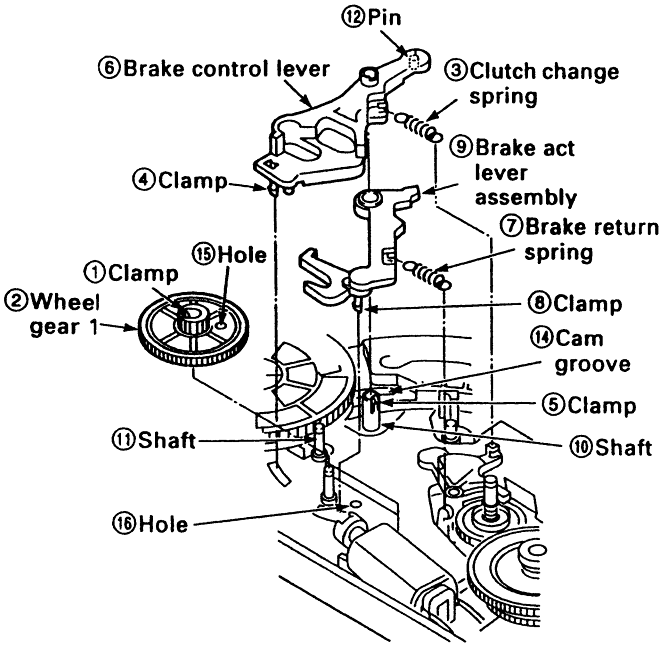

⑫Pin
⑥Brake control lever
③Clutch change spring
⑨Brake act lever assembly
④Clamp
⑦Brake return spring
⑮Hole
①Clamp
②Wheel gear 1
⑧Clamp
⑭Cam groove
⑤Clamp
⑪Shaft
⑩Shaft
⑯Hole

Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Remove the sub BT spring ②.
6) Press the BT spring lever assembly ③ until it touches the pin ④, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ⑤ shown in Fig. 3-13-3, and to the BT spring lever assembly ③ and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ③ on the Shaft ⑤, hook the BT spring onto the clamp ⑥ and press it until it touches the pin ⑦.
3. Make sure that the clamps ⑧, ⑨ and ⑩ have snapped into the S brake act slide ①. Align the arrow ⑪ on the S brake act slide ① with the arrow ⑫ on the mechanism chassis.

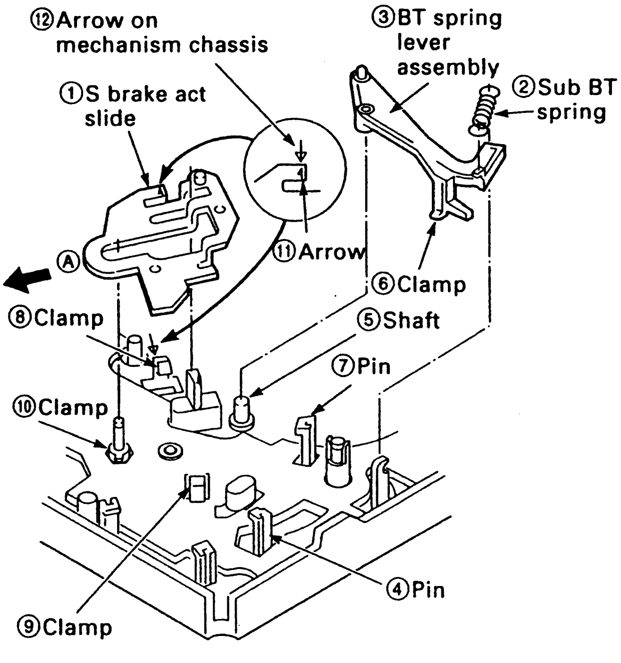

⑫Arrow on mechanism chassis
③BT spring lever assembly
②Sub BT spring
①S brake act slide
Ⓐ
⑪Arrow
⑥Clamp
⑧Clamp
⑤Shaft
⑦Pin
⑩Clamp
④Pin
⑨Clamp

Fig.3-13-3

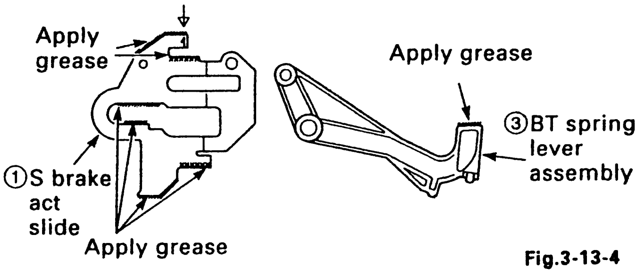

Apply grease
①S brake act slide
Apply grease
Apply grease
③BT spring lever assembly

Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ② by unscrewing them counterclockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

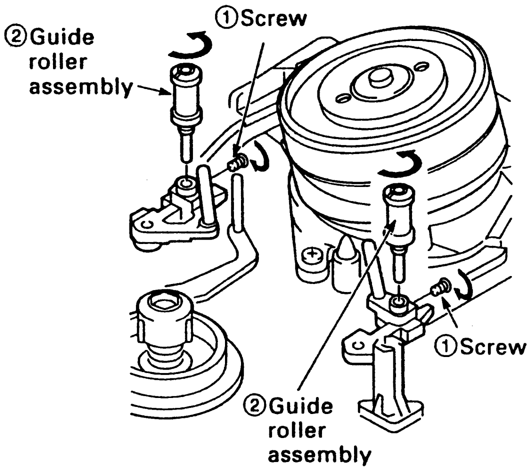

①Screw
②Guide roller assembly
①Screw
②Guide roller assembly

Fig.3-14-1

3-14-2.S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-5-2 and remove the cylinder unit.
3) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
4) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
5) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

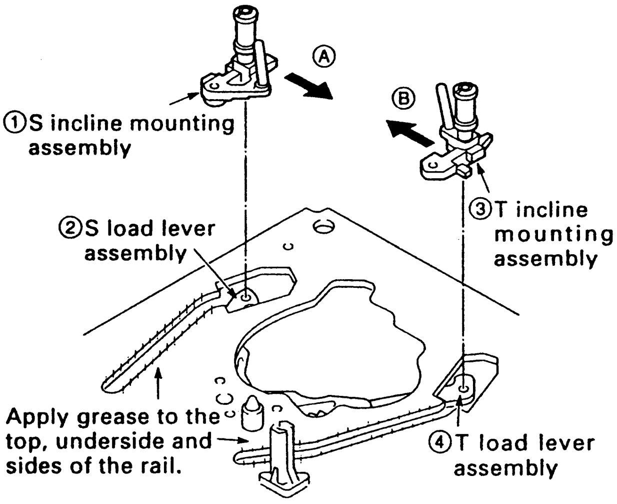

Ⓐ
Ⓑ
①S incline mounting assembly
②S load lever assembly
③T incline mounting assembly
Apply grease to the top, underside and sides of the rail.
④T load lever assembly

Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in ⒶⒷ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

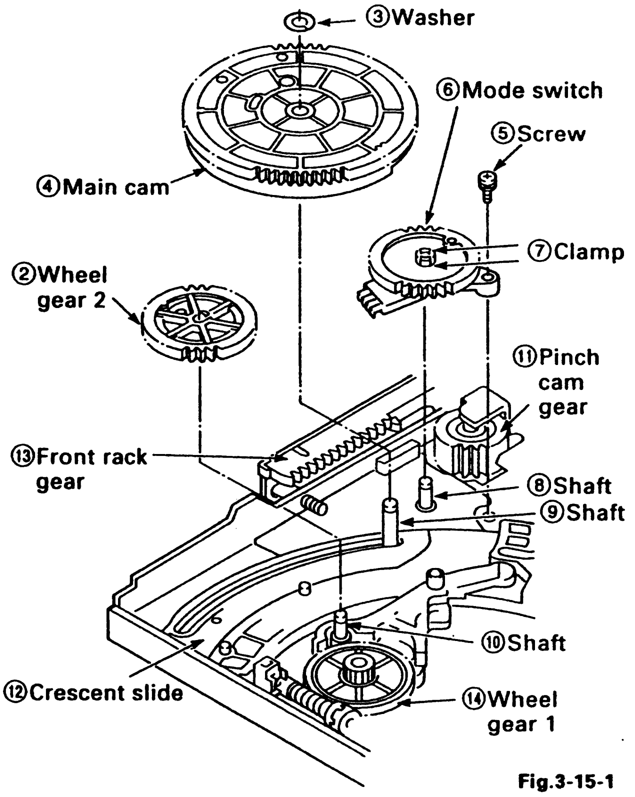

③Washer
⑥Mode switch
⑤Screw
④Main cam
⑦Clamp
②Wheel gear 2
⑪Pinch cam gear
⑬Front rack gear
⑧Shaft
⑨Shaft
⑩Shaft
⑫Crescent slide
⑭Wheel gear 1

Fig.3-15-1

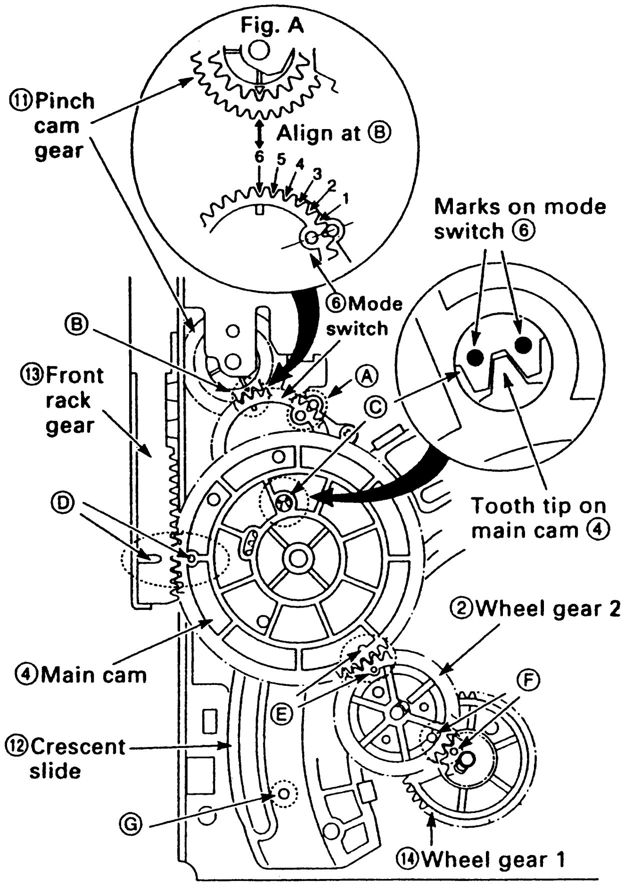


Fig. A
⑪Pinch cam gear
Align at Ⓑ
6 5 4 3 2 1
⑥Mode switch
Marks on mode switch ⑥
Ⓑ
Ⓐ
Ⓒ
⑬Front rack gear
Ⓓ
Tooth tip on main cam ④
②Wheel gear 2
④Main cam
Ⓕ
Ⓔ
⑫Crescent slide
Ⓖ
⑭Wheel gear 1

Fig.3-15-2

3-16. CRESCENT SLIDE
(See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp ④, then align the hole ⑤ with the hole ⑥ in the mechanism chassis. When you do this, check that the hole ⑦ is aligned with the pin ⑧ on the BT spring lever assembly, and that the hole ⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide ③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

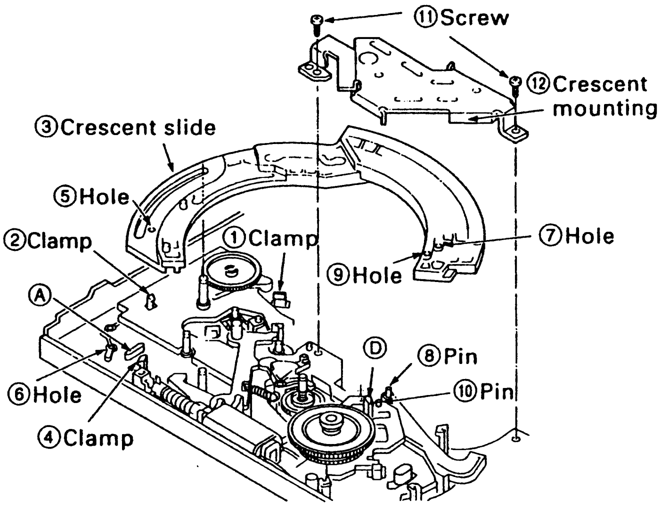


Fig.3-16-1

Apply grease to the areas shown in ▨
• The places marked by dots should be greased particularly generously.

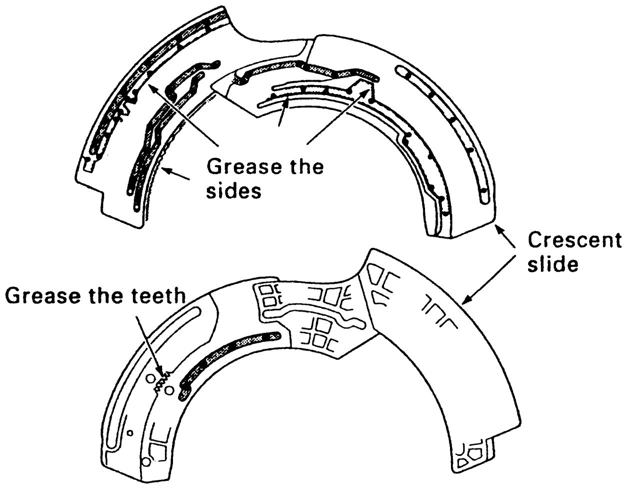


Fig.3-16-2

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

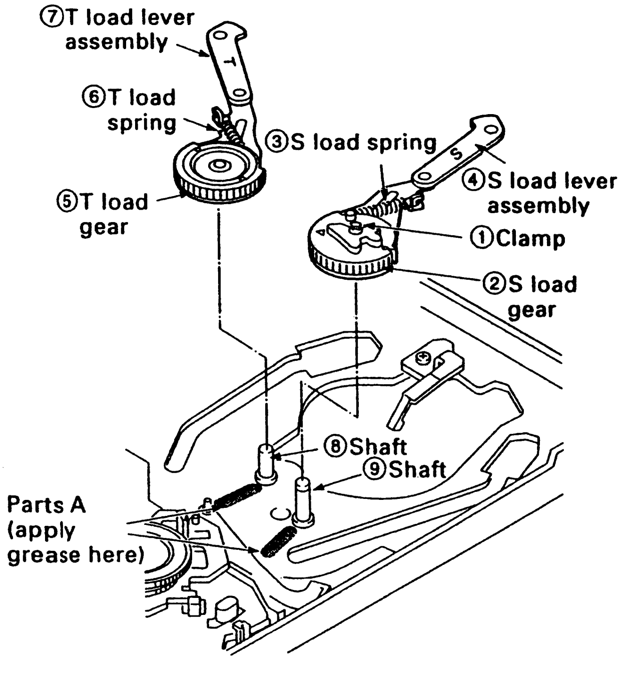

⑦T load lever assembly
⑥T load spring
③S load spring
⑤T load gear
④S load lever assembly
①Clamp
②S load gear
⑧Shaft
⑨Shaft
Parts A (apply grease here)

Fig.3-17-1

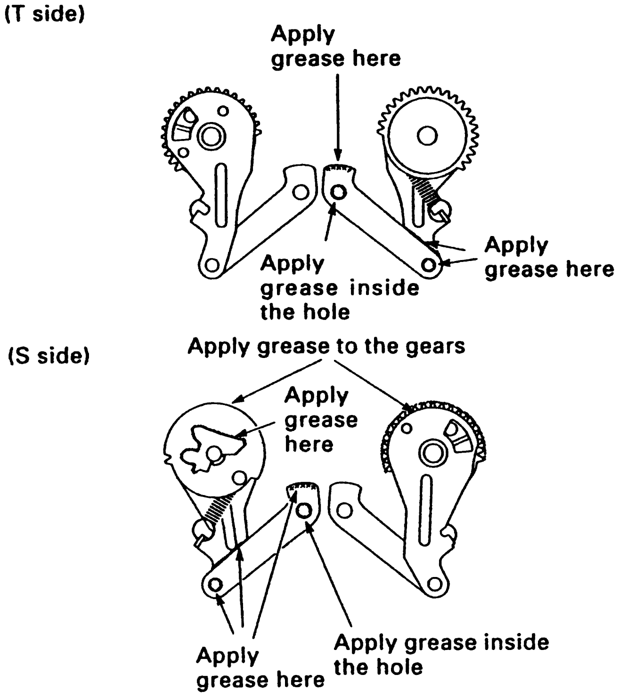

(T side)
Apply grease here
Apply grease inside the hole
Apply grease here
(S side)
Apply grease to the gears
Apply grease here
Apply grease here
Apply grease inside the hole

Fig.3-17-2

Fig. A: When tape loading is complete

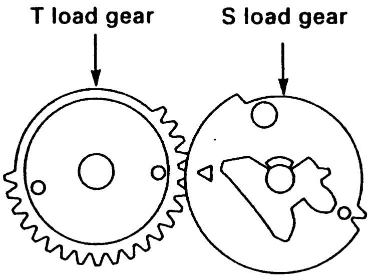

T load gear
S load gear

Fig. B: When tape unloading is complete

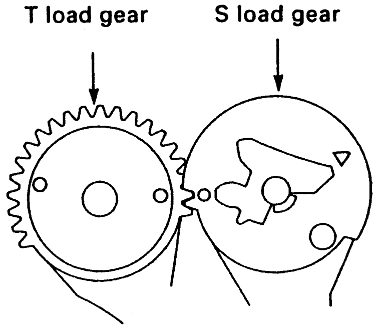

T load gear
S load gear

Fig.3-17-3

3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1 TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photoreceptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④. Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.

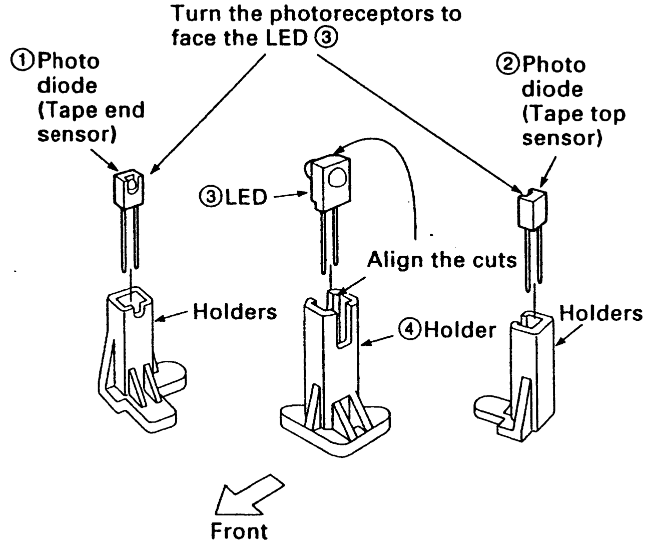

Turn the photoreceptors to face the LED ③
①Photo diode (Tape end sensor)
②Photo diode (Tape top sensor)
③LED
Align the cuts
Holders
④Holder
Holders
Front

Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diode (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.

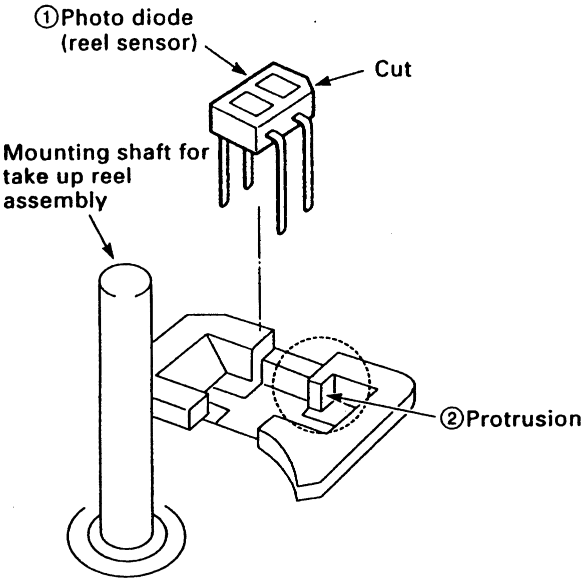

①Photo diode (reel sensor)
Cut
Mounting shaft for take up reel assembly
②Protrusion

Fig.3-18-2

3-18-3.EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.

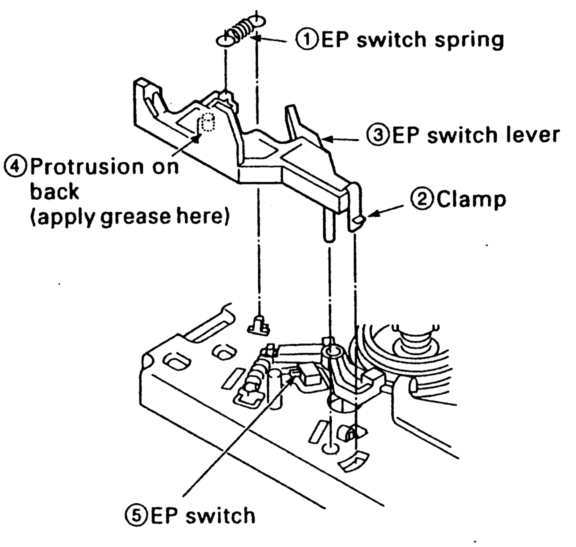

①EP switch spring
③EP switch lever
④Protrusion on back (apply grease here)
②Clamp
⑤EP switch

Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:

1. The measurements must be taken without any incandescent light or daylight.
2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm.
   Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.
3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).
4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 55 and 110g/cm (lock torque).

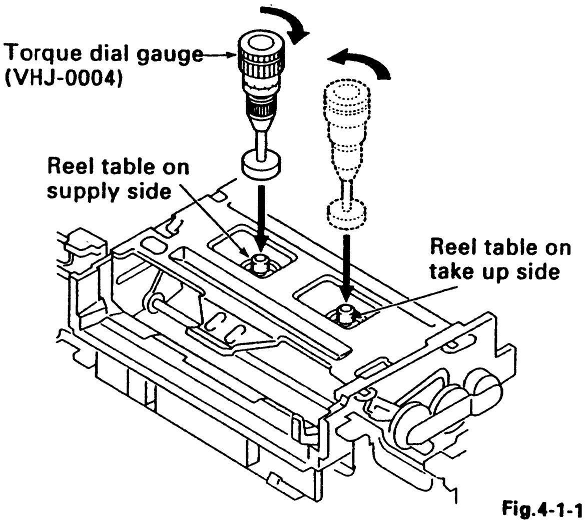

Torque dial gauge
(VHJ-0004)
Reel table on supply side
Reel table on take up side

Fig.4-1-1

5) After switching to REVIEW mode, wait for at least 10 seconds and then measure the torque value of the reel table on the supply side.It should be between 110 and 210 g/cm (lock torque).

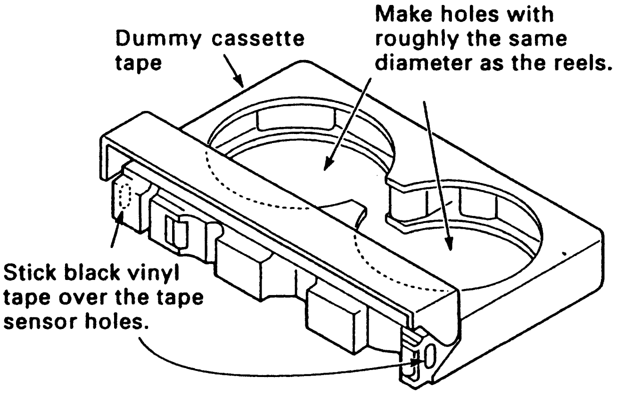

Dummy cassette tape
Make holes with roughly the same diameter as the reels.
Stick black vinyl tape over the tape sensor holes.

Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1.BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).
2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.
3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

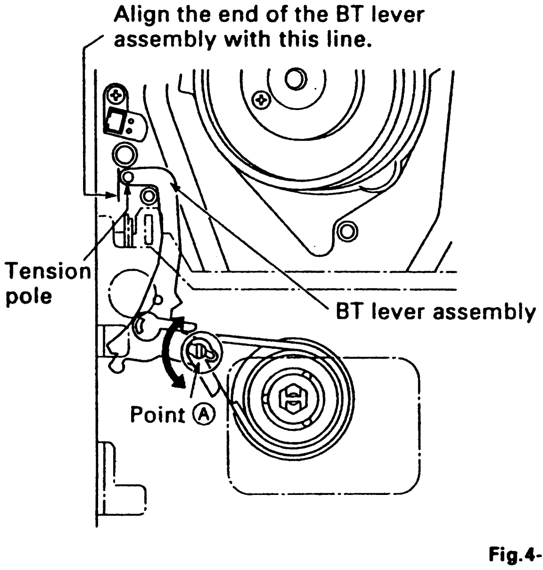

Align the end of the BT lever assembly with this line.
Tension pole
BT lever assembly
Point Ⓐ

Fig.4-2-1

4-2-2.CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.
2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

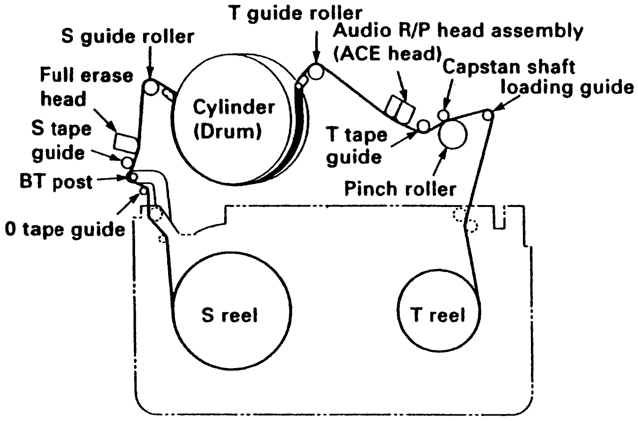


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz
PAL: For models with 625 scanning lnes and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE: The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2. LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0111) ③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly ① touches the height adjustment tool (VHJ-0111) ③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° counterclockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240). Wind the tape to the beginning, and repeat FF⟷REV five times (repeat for the same portion 30 to 60 seconds). If the bottom edge of the tape breaks, rotate the adjustment nut ④ in the counterclockwise direction by about 90°. Repeat FF ⟷REV five times again and check that the tape edge does not break (adjust again if it does). Next, repeat CUE⟷REV five times and check that the tape is not damaged. If damaged, rotate the adjustment nut in the clockwise direction by about 90°. Repeat FF⟷REW and CUE⟷REV and check that the tape is not damaged.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0111) when seen from directly overhead.

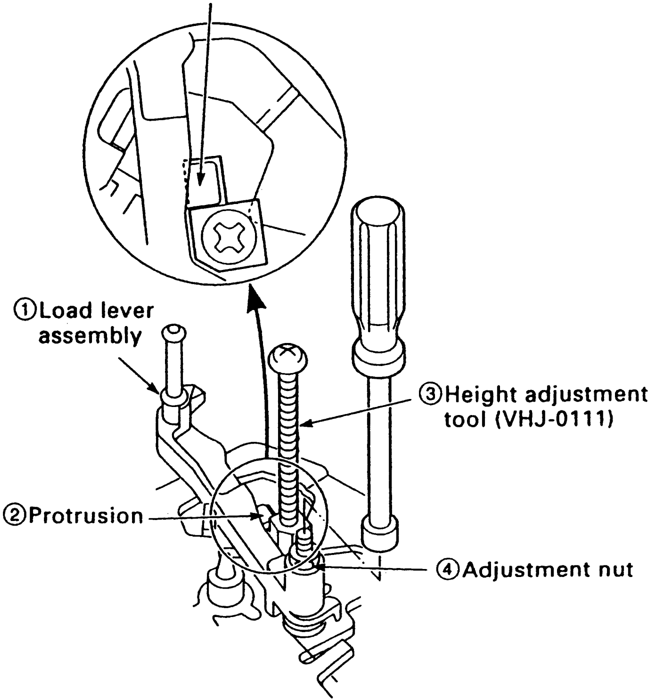
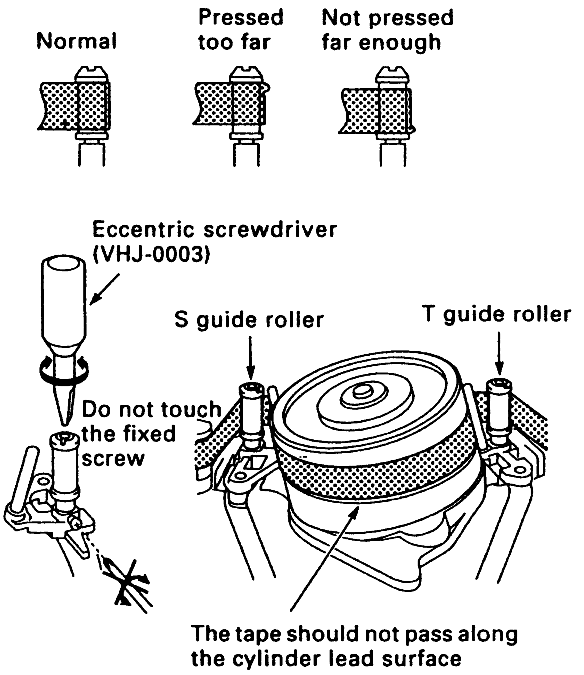


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Playback the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them counterclockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button, and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° counterclockwise.
3) Adjust the T guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from CUE to PLAY or from REV to PLAY. If the front half of the envelope waveform does fluctuate, tighten the S guide roller 1° to 20°. If the back half of the envelope waveform does fluctuate, repeat steps 3) and 4).

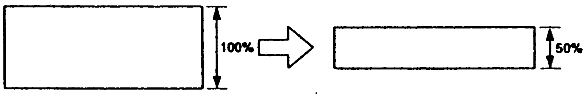


The tape should not pass along the cylinder lead surface

Fig.4-3-3

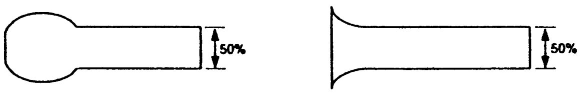
If the envelope waveform is at maximum at the tracking centre, adjust to flat.

In normal status, the waveform will be flat even when the envelope waveform is reduced to 50%.



(a) S guide roller pressed too far

(b) S guide roller not pressed far enough



(c) Normal status for wrapper waveform

(d) S guide roller pressed too far

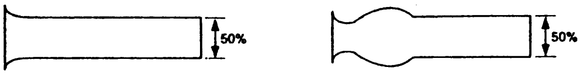


Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Hight/azimuth adjustment (See Fig.4-3-5)

1) Refer to section 4-3-3, complete the GUIDE ROLLER adjustment, and perform the AUDIO R/P HEAD adjustment.
   As the audio R/P head assembly (ACE HEAD) has been temporarily adjusted before shipment, do not rotate screws unnecessarily.
2) Mark screw Ⓐ, screw Ⓑ, and bracket with a waterproof marker so that their original positions can be known even after the screws are rotated.
   Marking screws Ⓐ and Ⓑ in the same direction will enable the adjustment mentioned later to be performed easily.
3) Play the adjustment tape (NTSC:VHJ-0005, PAL:VHJ-0008), and observe the audio output waveform using an oscilloscope.
   Loosen screw Ⓑ in the counterclockwise direction to decrease the audio output level. Then tighten it in the clockwise direction until the maximum level. Tighten further in the clockwise direction to decrease the level, and loosen in the counterclockwise direction until the maximum level.
4) Rotate screw Ⓐ in the same direction by the same degree as screw Ⓑ in step 1. (Check visually according to the mark made.)
5) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (temporary azimuth adjustment).
6) Perform the adjustments in 3) to 5) again.
7) Perform fine adjustments using screw Ⓑ.
   Perform the same adjustments as 3), and if screw Ⓑ was adjusted by more than 30 degrees, perform the adjustment in step 4) again, and then perform fine adjustments.
8) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (actual azimuth adjustment).

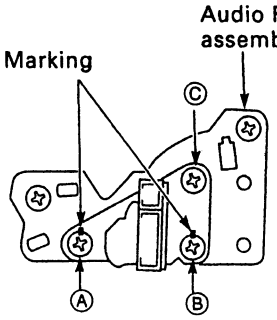


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (tracking + and tracking −) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VSJ-1001 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (tracking + and tracking −) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the tracking − button the messages "T -: " and "T - -: " will appear, while if you keep pressing the tracking + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

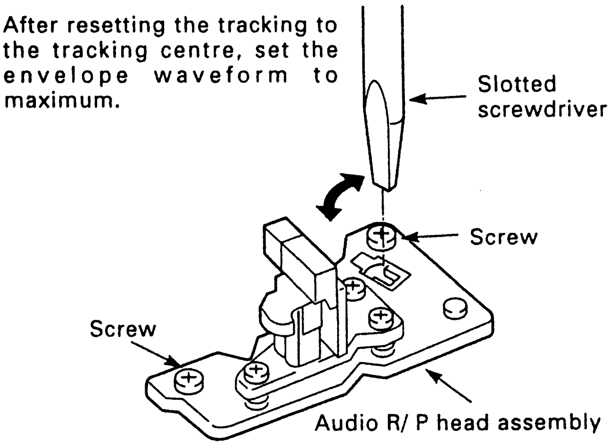

After resetting the tracking to the tracking centre, set the envelope waveform to maximum.
Slotted screwdriver
Screw
Screw
Audio R/ P head assembly

Fig.4-3-6

4-3-5.CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to REV or from REV to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, CUE, REV or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, CUE or REV modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

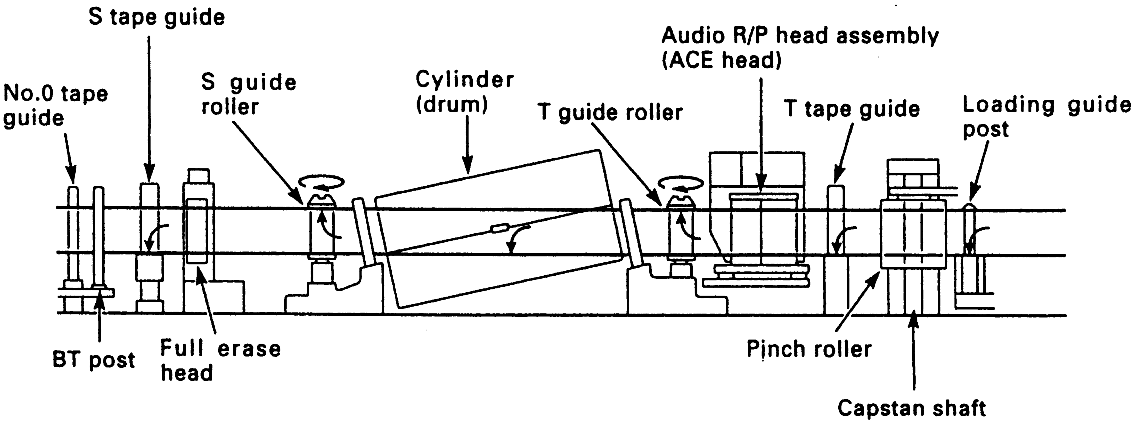

S tape guide
Audio R/P head assembly
(ACE head)
No.0 tape guide
S guide roller
Cylinder (drum)
T guide roller
T tape guide
Loading guide post
BT post
Full erase head
Pinch roller
Capstan shaft

Fig.4-3-7

Section 4
Electrical Adjustment

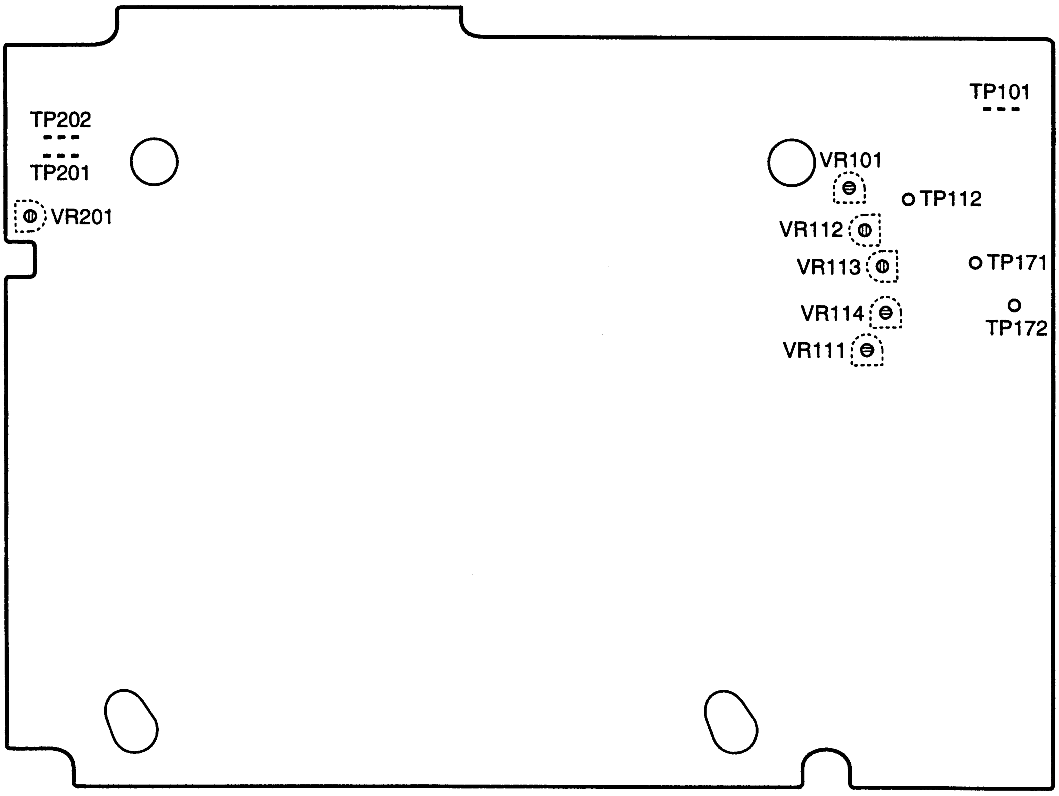
4-1. Servo Circuit Adjustment

- These adjustments should be carried out upon completion of the tape transport adjustments.
- If the tape transport adjustments (except the tilt adjustment) are done after these adjustments, follow the procedures again in section 4-1-3. "Switching Position Adjustment."
- When a cassette tape is loaded, auto-tracking will be set immediately after starting the first playback. As this will deviate the tracking center set, be sure to tracking center position after starting playback to prevent auto-tracking from being set.

4-1-1. Test Equipment and Standards Required

Color Bar Signal Generator	PAL color bar signal with 100% white level (color bar signal)
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Alignment Tape	VHJ-0009 : SP mode, monoscope, 6 kHz
Blank Tape	VHS cassette tape
Monitor TV	

4-1-2. Location of Adjustment Points



CP-1 PWB (Foil side)

Fig. 4-1-1

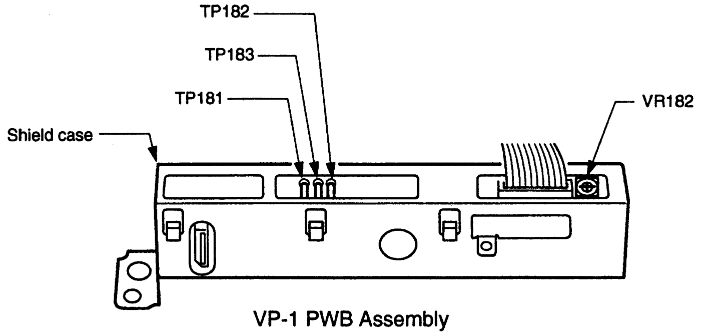

TP182
TP183
TP181
Shield case
VR182
VP-1 PWB Assembly

Fig. 4-1-2

Notes :

- **Set the REC/PLAY SPEED button to indicator panel to the 3H (3 hours) mode.**
- **Self-recording means "Record any broadcasting or video signal and play back the just-recorded portion".**

4-1-3. Switching Position Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP101(VIDEO OUT terminal) TP183 (SW-P)	Oscilloscope	PLAY (3H) mode Alignment tape VHJ-0009

Adj. Condition	Adj. Condition
REC button TRACKING buttons EJECT button	6.5 H ±0.5 H

1. Play back the alignment tape. Press the TRACKING buttons (+) and (−) simultaneously. (TRACKING center position)
2. Press the REC button three times within 10 seconds after the display is shown. All three presses must be carried out within 2 seconds. For the third time, press the REC button more than 0.5 seconds as shown in Fig. 4-1-3.
3. The automatic adjustment mode is set, the numerals of Indicator display "P 0 : 00" changes automatically and the unit stops at the point the adjustment value becomes approx. 6.5 H.
4. In the same adjustment mode, trigger at the edge of the RF SW pulse, and check that the front edge of the V sync signal from the fall edge of the RF SW pulse is delayed by 6.5 H ±0.5 H as shown in Fig. 4-1-4. If it is not 6.5 H ±0.5 H, manually perform fine adjustments for the TRACKING buttons (+) or (−) to satisfy the specification.
5. After completing adjustments, press the EJECT button (more than 1 second) and check the Indicator shows "P – : –" at this time.

Note : Repeat steps 1 to 4 if the adjustment takes more then 10 seconds.

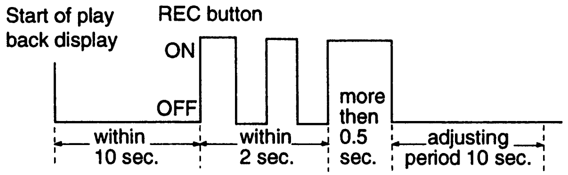

Start of play back display
REC button
ON
OFF
more then 0.5 sec.
within 10 sec.
within 2 sec.
adjusting period 10 sec.

Fig. 4-1-3

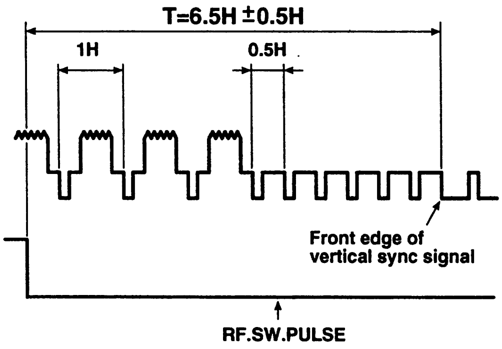

T=6.5H ±0.5H
1H
0.5H
Front edge of vertical sync signal
RF.SW.PULSE

Fig. 4-1-4

4-1-4. SP STILL V-LOCK Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor TV	Color bar generator (Monoscope pattern signal) Monitor TV	Self-recording (3H) mode STILL PLAY mode Blank tape

Adj. Location	Adj. Value
TRACKING buttons REC button	—

1. Insert blank VHS cassette tape and record monoscope pattern on the 3H mode.
2. Play back the self-recorded tape and then set the VCR in the STILL mode.
3. Press the (+) or (−) TRACKING button so that the vertical shake of picture becomes its minimum.

4-1-5. F. Slow Tracking Confirm and Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
Picture of monitor TV	Color bar generator (Monoscope pattern signal) Monitor TV	Self-recording (3H) mode PLAY mode Blank tape

Adj. Location	Adj. Value
TRACKING buttons MENU RESET button REC button	—

1. Insert blank VHS cassette tape and record monoscope pattern on the 3H mode.
2. Play back the self-recorded tape and then set the VCR in the STILL mode.
3. Change to F. Slow play back mode by pressing MENU RESET button more than 1 second.
4. Set the tracking control position to the center by pressing TRACKING (+) and (−) buttons simultaneously, and confirm the absence of noise in the slow playback image on the monitor screen at this centered tracking position. Starting from this centered tracking position, push the (+) and (−) buttons and confirm that no noise appears before the fifth push in either direction.

   If noise appears before the fifth push, fine-tune with the front tracking adjustment button so that no noise appears before the fifth push, then press the REC button to make this point the new tracking center. (When pressing the REC button to enter this new tracking center, the tracking should be displayed.)

   The FLD counter readout changes to "P – : –" for approximately 1 second in order to confirm that data has been entered.

4-2. Video Circuit Adjustment

Before making the following adjustments, complete the adjustments described in section 4-1. "Servo Circuit."

4-2-1. Test Equipment and Standards Required

Color Bar Signal Generator	PAL color bar signal with 100% white level (color bar signal)
Frequency Counter	
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Bandwidth : more than 10 MHz
Oscilloscope Probe	Input capacity : less than 25 pF (10:1) less than 40 pF (1:1) Covering frequency : DC to 40 MHz (10:1) DC to 30 MHz (10:1)
Alignment Tape	VHJ-0008 : SP mode, color bar, 1 kHz (Color bar signal waveform is described below. Refer to Fig. 4-2-1.)
Blank Tape	VHS cassette tape
Alignment Relay Jig	VHJ-0066 : 7-wire flat cable for VP-1 PWB assembly

Alignment Tape Color Bar Signal

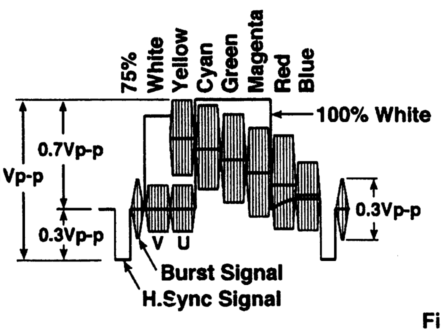

75% White
Yellow
Cyan
Green
Magenta
Red
Blue
100% White
0.7Vp-p
1Vp-p
0.3Vp-p
0.3Vp-p
V U
Burst Signal
H.Sync Signal

Fig. 4-2-1

(75 %) →

White	Yellow	Cyan	Green	Magenta	Red	Blue
V	U	100% White			Black	

Fig. 4-2-2

Adjustment Relay Jig

Connect the flat cable end from the cylinder assembly to the VP-1 PWB assembly using the relay jig to provide simple repairing or adjustment of the VP-1 PWB assembly, as shown in Fig. 4-2-3. Further, when adjusting the VP-1 PWB assembly, be sure to make contact an end of shield case with bracket of the VP-1 PWB assembly to maintain the shield effect. If the VP-1 PWB assembly does not contact, there is insufficient ground and no proper play back image can be obtained.

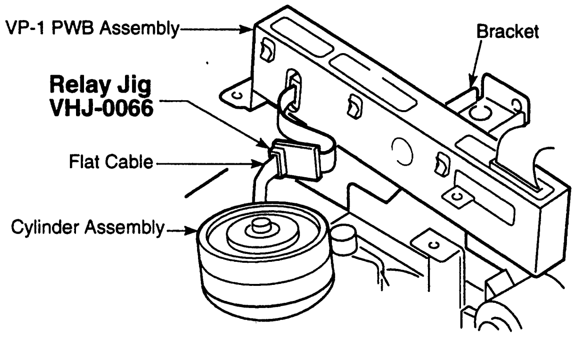
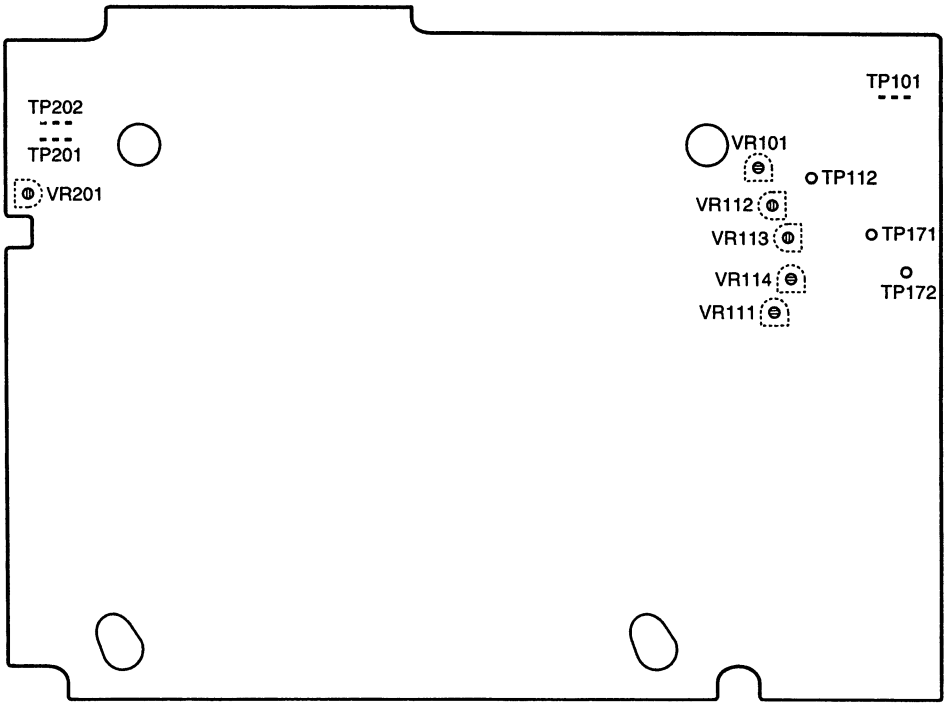

VP-1 PWB Assembly
Bracket
Relay Jig
VHJ-0066
Flat Cable
Cylinder Assembly

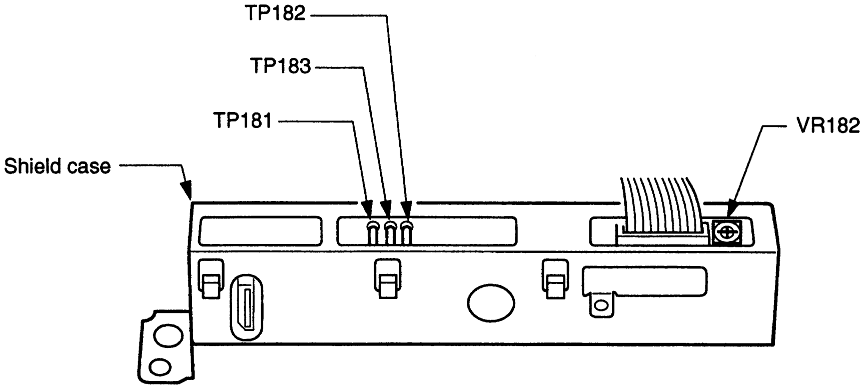
Fig. 4-2-3

4-2-2. Location of Test Points


TP202
TP201
VR201
TP101
VR101
TP112
VR112
VR113
TP171
VR114
TP172
VR111

CP-1 PWB (Foil side)

Fig. 4-2-4


TP182
TP183
TP181
VR182
Shield case

VP-1 PWB Assembly

Fig. 4-2-5

Notes :

- **Self-recording means "Record the video signal and play back the just-recorded portion."**

4-2-3. AGC Level Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP101	Color bar generator Oscilloscope	E-E mode

Adj. Location	Adj. Value
⊘VR112 (AGC)	1.00 Vp-p ±0.03 Vp-p

1. Terminate TP101 and ground with a 75 Ω resistor.
2. Connect the color bar generator (color bar signal with 100 % white level) to the VIDEO IN terminal.
3. Adjust ⊘VR112 (AGC) for 1.00 Vp-p ±0.03 Vp-p as shown in Fig. 4-2-6.

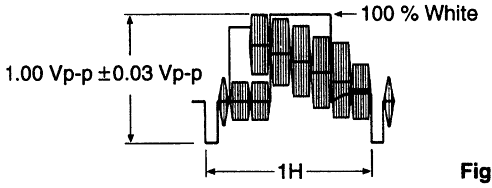


Fig. 4-2-6

4-2-4. PB-Y Level Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP101	Oscilloscope	PB mode Alignment tape VHJ-0008

Adj. Location	Adj. Value
⊘VR111 (PB-Y)	1.00 Vp-p ±0.03 Vp-p

1. Terminate TP101 and ground with a 75 Ω resistor.
2. Play back the alignment tape.
3. Adjust ⊘VR111 (PB-Y) for the video luminance signal level of 1.00 Vp-p ±0.03 Vp-p as shown in Fig. 4-2-7.

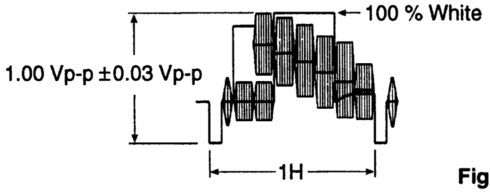


Fig. 4-2-7

4-2-5. Sync Tip Carrier Set Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP112	Color bar generator Frequency counter	E-E mode

Adj. Location	Adj. Value
⊘VR113 (CAR)	4.00 MHz ±0.03 MHz

1. Set the E-E mode in the "no signal" state.
2. Connect the frequency counter to TP112 and adjust to 4.00 MHz ±0.03 MHz using ⊘VR113 (CAR).

4-2-6. Deviation Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP101	Color bar generator Oscilloscope	Self-recording (3H) mode PLAY mode Blank tape

Adj. Location	Adj. Value
⊘VR114 (DEV)	1.00 Vp-p ±0.02 Vp-p

1. Terminate TP101 and ground with a 75 Ω resistor.
2. Connect the color bar generator (color bar signal with 100 % white level) to the VIDEO IN terminal.
3. Record the color bar signal on the blank tape.
4. Play back of the just-recorded portion.
5. Confirm the Y level of 1.00 Vp-p ±0.02 Vp-p as shown in Fig.4-2-8.
6. If the adjustment value is not satisfactory, turn ⊘VR114 a few times (DEV) and repeat steps 3 to 5.

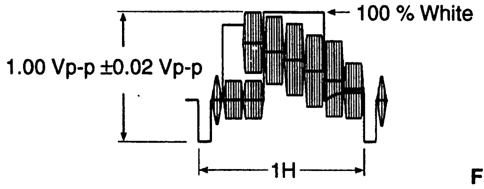


Fig. 4-2-8

4-2-7. C REC Current Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP181	Color bar generator Oscilloscope	REC (3H) mode Blank tape

Adj. Location	Adj. Value
➋VR101 (REC-C)	140 mVp-p ±10 mVp-p

1. Connect the color bar generator (color bar signal with 100 % white level) to the VIDEO IN terminal.
2. Turn ➋VR182 to clockwise fully and adjust ➋VR101 (REC-C) so that in video chroma signal level is 140 mVp-p ±10 mVp-p. (Refer to Fig. 4-2-9)

Note: Adjust the after is turned off.

Push TRACKING+ button with pushing STOP button to turn off ORC.

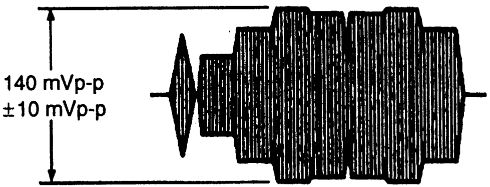


Fig. 4-2-9

4-2-8. Y REC Current Adjustment

Measuring Point	Measuring Equipment	Adj. Condition
TP181	Color bar generator Oscilloscope	REC (3H) mode Blank tape

Adj. Location	Adj. Value
➋VR182 (REC-Y)	550 mVp-p ±20 mVp-p

1. Connect the color bar generator (color bar signal with 100 % white level) to the VIDEO IN terminal.
2. Adjust ➋VR182 (REC-Y) so that in video luminance signal level is 550 mVp-p ±20 mVp-p. (Refer to Fig. 4-2-10)

Note: Adjust the after is turned off.

Push TRACKING+ button with pushing STOP button to turn off ORC.

This adjustment should be performed after completion of 4-2-5.

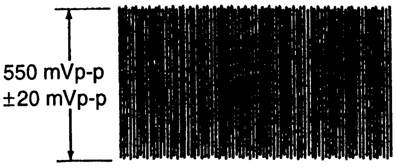


Fig. 4-2-10

4-3. Audio Circuit Adjustment

Before making these adjustments, be sure to make the adjustments described in section 4-1. "Servo Circuit." and section 4-2. "Video Circuit."

4-3-1. Test Equipment and Standards Required

Oscilloscope	Vertical sensitivity : 5 mV/DIV Bandwidth : more than 30 MHz
AC Voltmeter	Effective value indication Input frequency : 10 Hz to 20 kHz Input impedance : more than 1 MΩ Measurement level : 1 mV (full scale)
Frequency Counter	Input frequency : 20 Hz to 10 MHz
Blank Tape	VHS cassette tape

4-3-2. Location of Adjustment Points

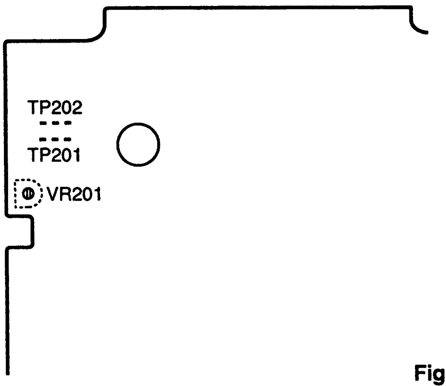


Fig. 4-3-1

Note :
Set the following switch to the positions indicator below, before making following adjustments.

SWITCH	POSITION
REC/PLAY SPEED	3H

4-3-3. BIAS Level Adjustment

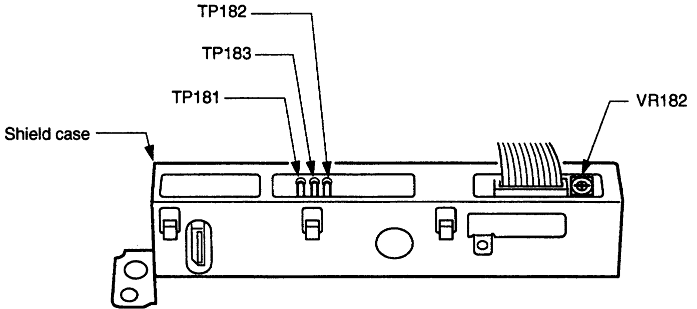
Measuring Point	Measuring Equipment	Adj. Condition
TP201 (HOT) TP202 (COLD)	Oscilloscope AC voltmeter Frequency counter	REC mode Blank tape

Adj. Location	Adj. Value
⊘VR201 (BIAS LEV)	21 mVrms

1. Insert VHS blank tape and select the record mode without all incoming signal.
2. After confirming on the oscilloscope that a 70 kHz ±5 kHz sine wave is being output, adjust ⊘VR201 (BIAS LEV) so that the AC voltmeter's reading is 21 mVrms.

4-4. Test Points for Tape Path Adjustment

Test points TP182 (ENV) and TP183 (SW-P) for tape path adjustment are shown in figure below.



VP-1 PWB Assembly

Fig. 4-4-1

Section 5
Spare Parts

5-1. Notes on Repair Parts

1. Safety Related Components Warning

WARNING

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

2. Standardization of Parts

Some repair parts supplied by Sony differ from those used for the unit. These are because of parts commonality and improvement.
Parts list has the present standardized repair parts.

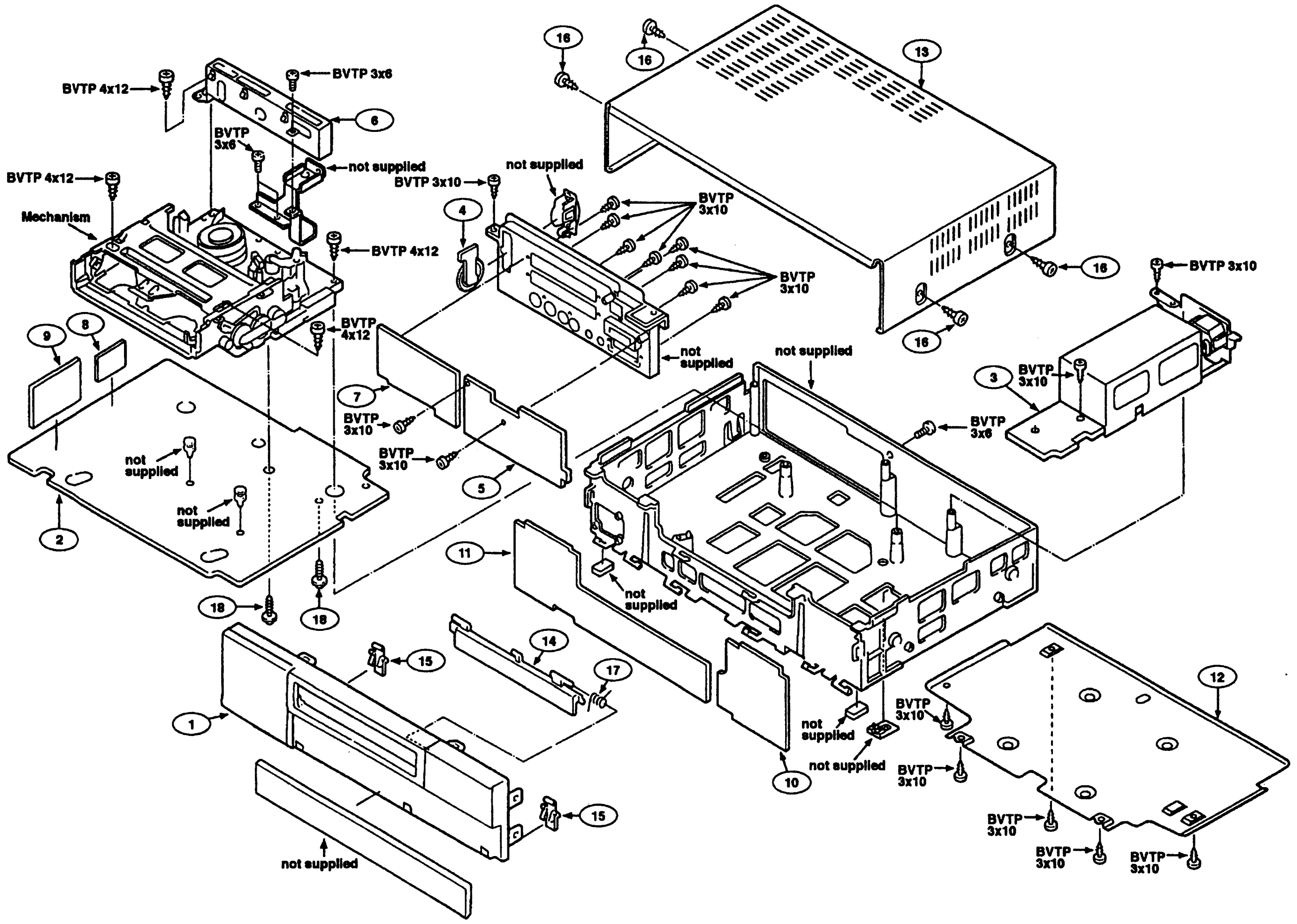
3. Stock of Parts

Parts marked with "o" at SP (Supply Code) column of the spare parts list may not be stocked. Therefore, the delivery date will be delayed.

4. Harness

Harnesses with no part number are not registered as spare parts.
In need of repair, get components shown in the list and repair using them.

5-2. Exploded Views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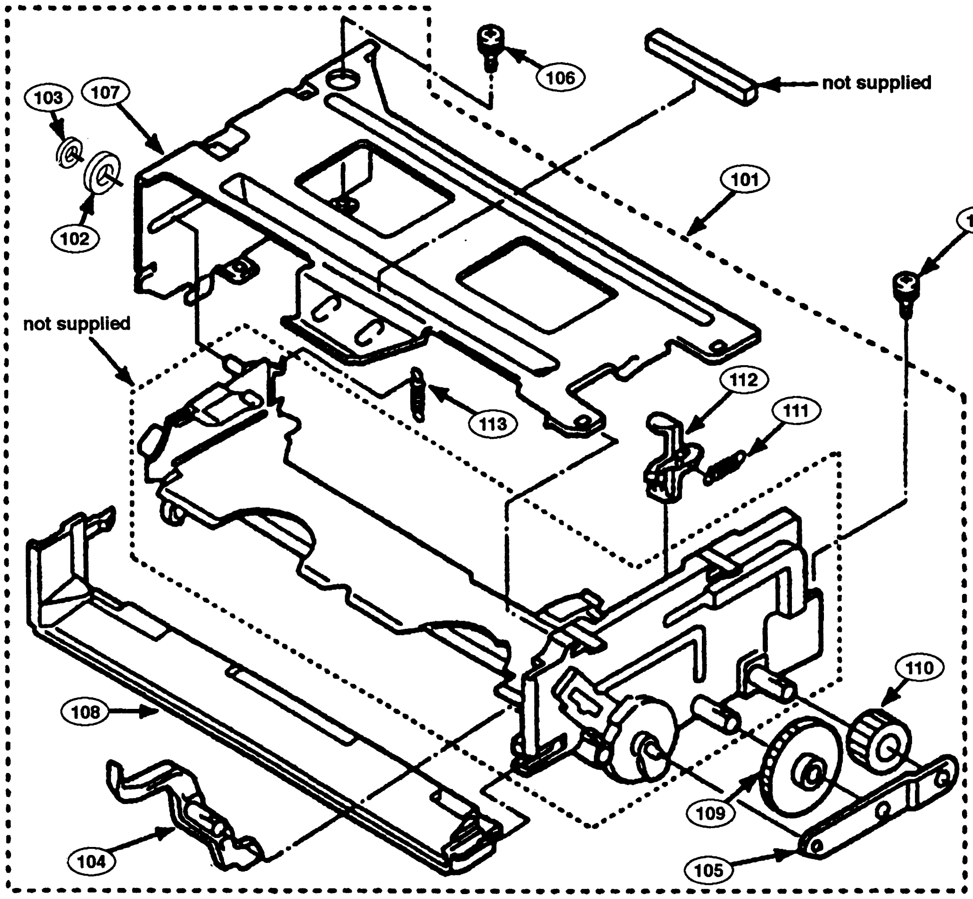
16
13
BVTP 4x12
BVTP 3x6
6
BVTP 3x6
not supplied
BVTP 4x12
Mechanism
not supplied
BVTP 3x10
4
BVTP 3x10
BVTP 4x12
BVTP 3x10
16
BVTP 3x10
9
8
BVTP 4x12
7
not supplied
not supplied
16
3
BVTP 3x10
BVTP 3x10
BVTP 3x6
not supplied
not supplied
BVTP 3x10
5
2
11
not supplied
18
18
14
15
17
12
1
BVTP 3x10
not supplied
not supplied
10
BVTP 3x10
15
BVTP 3x10
BVTP 3x10
BVTP 3x10
not supplied

No.	Part No.	SP	Description
1	A-8324-050-A	s	CABINET ASSY, FRONT
2	A-8324-052-A	o	MOUNTED CIRCUIT BOARD, CP-A
3	A-8324-056-A	o	MOUNTED CIRCUIT BOARD, PW-1
4	A-8324-057-A	o	MOUNTED CIRCUIT BOARD, TB-2
5	A-8324-058-A	o	MOUNTED CIRCUIT BOARD, CT-1
6	A-8324-059-A	o	MOUNTED CIRCUIT BOARD, VP-1
7	A-8324-060-A	o	MOUNTED CIRCUIT BOARD, TB-1
8	A-8324-061-A	o	MOUNTED CIRCUIT BOARD, VD-1
9	A-8324-062-A	o	MOUNTED CIRCUIT BOARD, VD-2
10	A-8324-063-A	o	MOUNTED CIRCUIT BOARD, TM-2
11	A-8324-064-A	o	MOUNTED CIRCUIT BOARD, TM-1
12	3-203-300-01	s	COVER, BOTTOM
13	3-203-319-01	o	COVER, TOP
14	3-203-326-01	s	DOOR, CASSETTE
15	3-740-330-01	s	LOCK
16	3-740-382-01	s	+BTS-B S 4X12
17	3-960-936-01	s	SPRING
18	3-965-446-01	s	SCREW, SPECIAL


103
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not supplied
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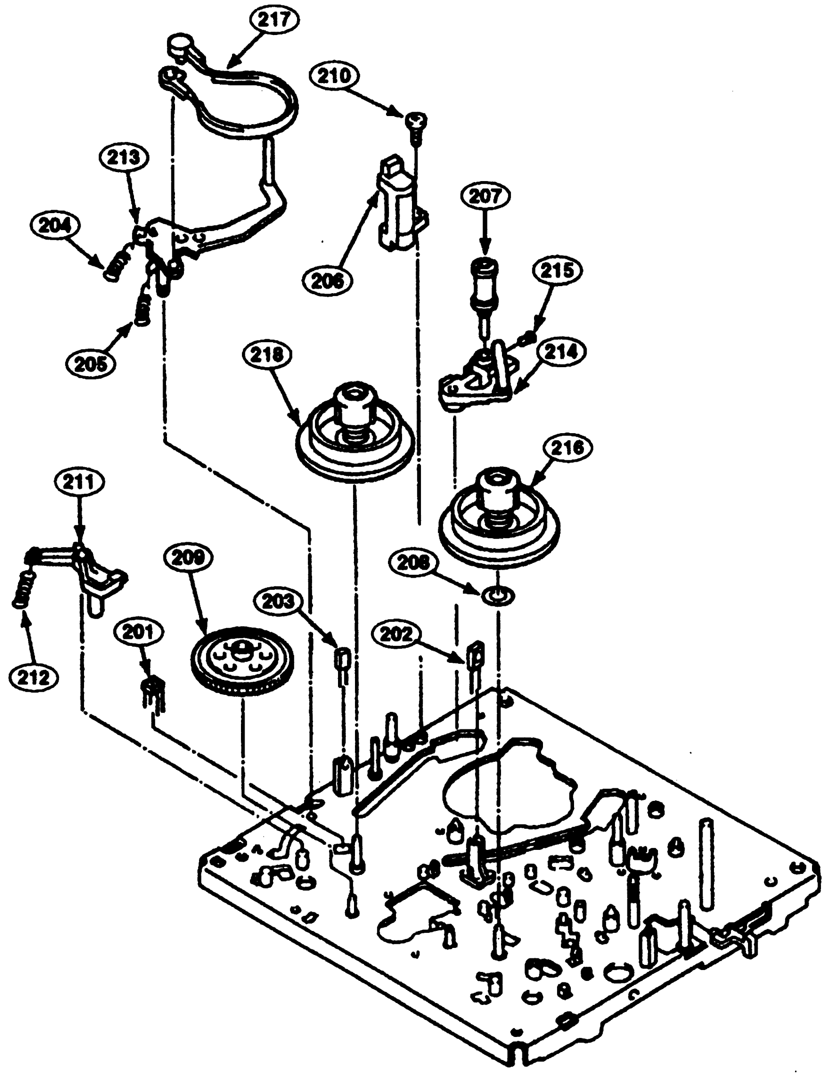
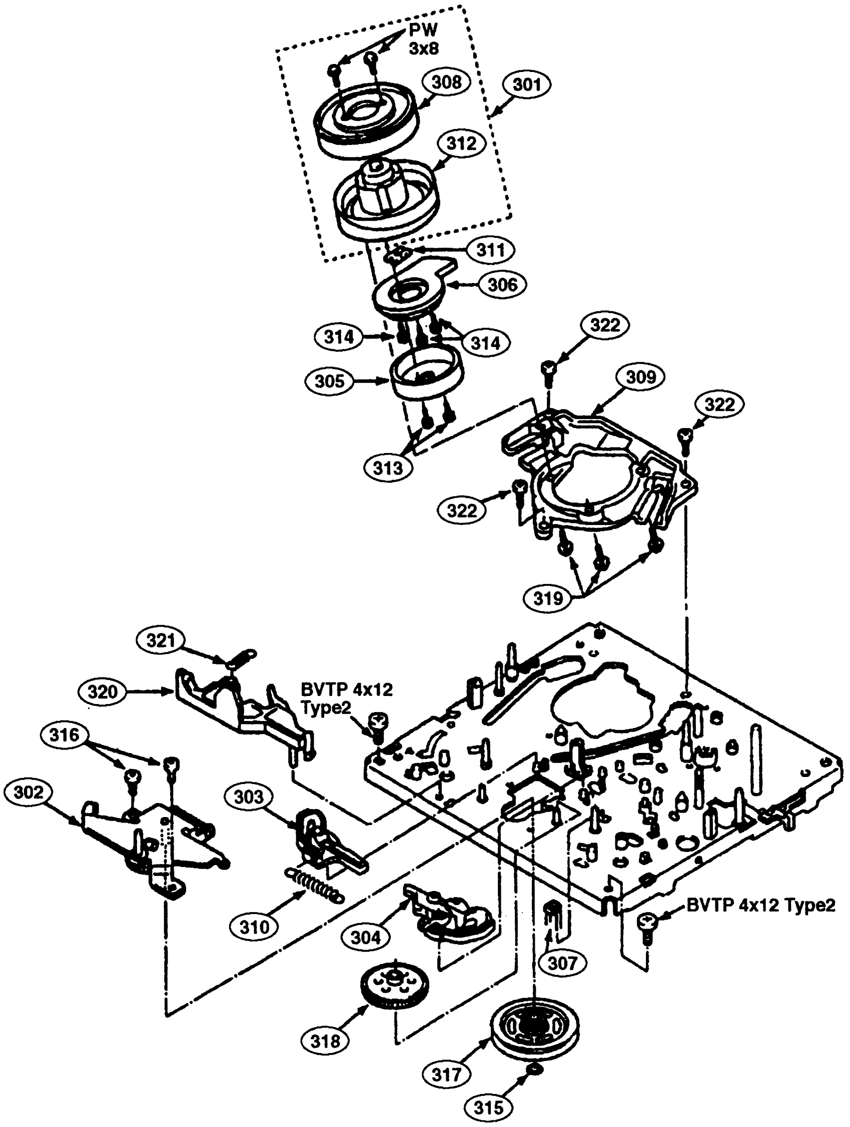
105

No.	Part No.	SP	Description
101	A-8321-974-A	o	MECHANICAL ASSY, CASSETTE
102	3-202-102-01	s	WASHER (F)
103	3-735-759-01	s	WASHER (DIA.3)
104	3-960-915-01	s	LEVER, DOOR OPENER
105	3-960-916-01	o	HOLDER, GEAR
106	3-960-939-01	s	SCREW (2.6X6), SPECIAL
107	3-960-952-01	o	STAND (L)
108	3-960-954-01	s	FRAME, UNDER
109	3-960-959-01	s	GEAR, LOCK
110	3-960-960-01	s	GEAR, PINION
111	3-961-301-01	s	SPRING, LID OPENER
112	3-961-302-01	s	LEVER, RELEASE
113	3-961-303-01	s	SPRING, LOCK TRAY

MECHANISM DECK SECTION 2



No.	Part No.	SP	Description
201	1-801-326-11	s	PHOTO COUPLER SG-105F
202	1-810-690-11	s	LED LN59L
203	1-810-691-11	s	PHOTO DIODE PN263L-NC
204	3-193-650-01	s	SPRING, BT (TL)
205	3-193-651-01	s	SPRING, BT SUB (TL)
206	3-193-669-01	s	HEAD, ERASE (FULL)
207	3-735-630-01	s	ROLLER ASSY, GUIDE
208	3-735-754-01	s	WASHER (DIA.3), ADJUSTMENT
209	3-960-927-01	s	GEAR, S REEL
210	3-960-984-01	s	SCREW (2.6X10), SPECIAL
211	3-961-002-01	s	LEVER, S SOFT
212	3-961-003-01	s	SPRING, S SOFT
213	3-961-016-01	s	LEVER ASSY, BT
214	3-961-037-01	s	MOUNT ASSY, S INC LINE
215	3-961-038-01	s	SCREW (2X3), SPECIAL
216	3-963-782-01	s	REEL (ASSY), TAKE UP
217	3-963-789-01	s	BAND (ASSY), BRAKE
218	3-977-065-01	s	REEL, SUPPLY (ASSY)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BVTP 4x12
Type2
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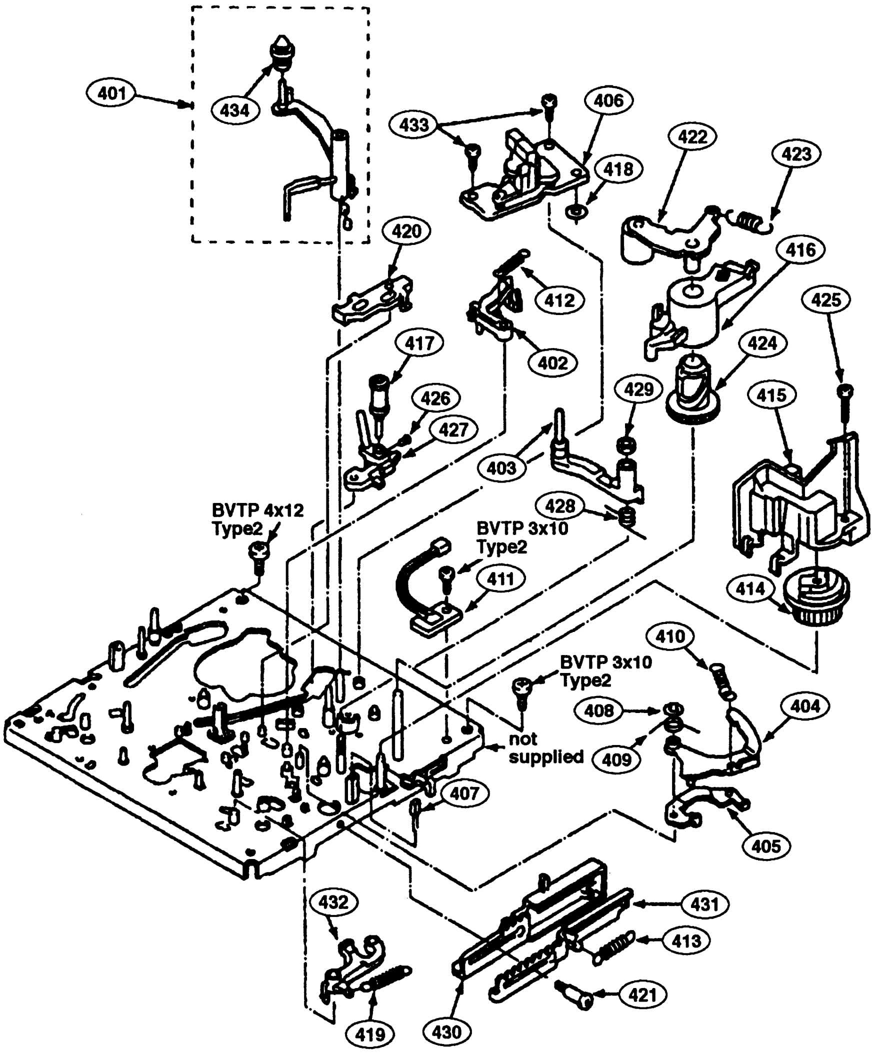
307
BVTP 4x12 Type2
317
315

No.	Part No.	SP	Description	No.	Part No.	SP	Description
301	A-8311-884-A	o	COMPLETE PWB, CYLINDER	312	3-746-722-11	s	CYLINDER (LWR 4)
302	A-8316-756-A	s	MOUNT (COMPLETE PWB) ASSY	313	3-746-760-01	s	SCREW (2.3X6), SPECIAL
303	A-8325-366-A	s	BRAKE (S90) ASSY	314	3-746-761-01	s	SCREW (2.3X10), SPECIAL
304	A-8325-367-A	s	BRAKE (T90) ASSY	315	3-948-603-01	s	WASHER, SPECIAL
305	1-698-912-11	s	MOTOR, ROTOR CYL DC 2W	316	3-960-925-01	s	SCREW (2.6X4), SPECIAL
306	1-698-913-11	s	MOTOR, STATOR CYL DC 2W	317	3-960-926-01	s	PULLEY, REEL
307	1-801-326-11	s	PHOTO COUPLER SG-105F	318	3-960-928-01	s	GEAR, T REEL
308	3-191-497-01	s	CYLINDER (UPR 2NP4-Q0)	319	3-960-980-01	s	SCREW (2.6X7), SPECIAL
309	3-193-652-01	s	CYLINDER, MOUNTING	320	3-961-022-01	s	LEVER, EP SWITCH
310	3-203-992-01	s	SPRING, BRAKE (90)	321	3-961-023-01	s	SPRING, EP SWITCH
311	3-735-738-01	s	SPACER, MOTOR	322	3-961-033-01	s	SCREW (2.6X8), SPECIAL

MECHANISM DECK SECTION 4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BVTP 4x12 Type2
BVTP 3x10 Type2
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BVTP 3x10 Type2
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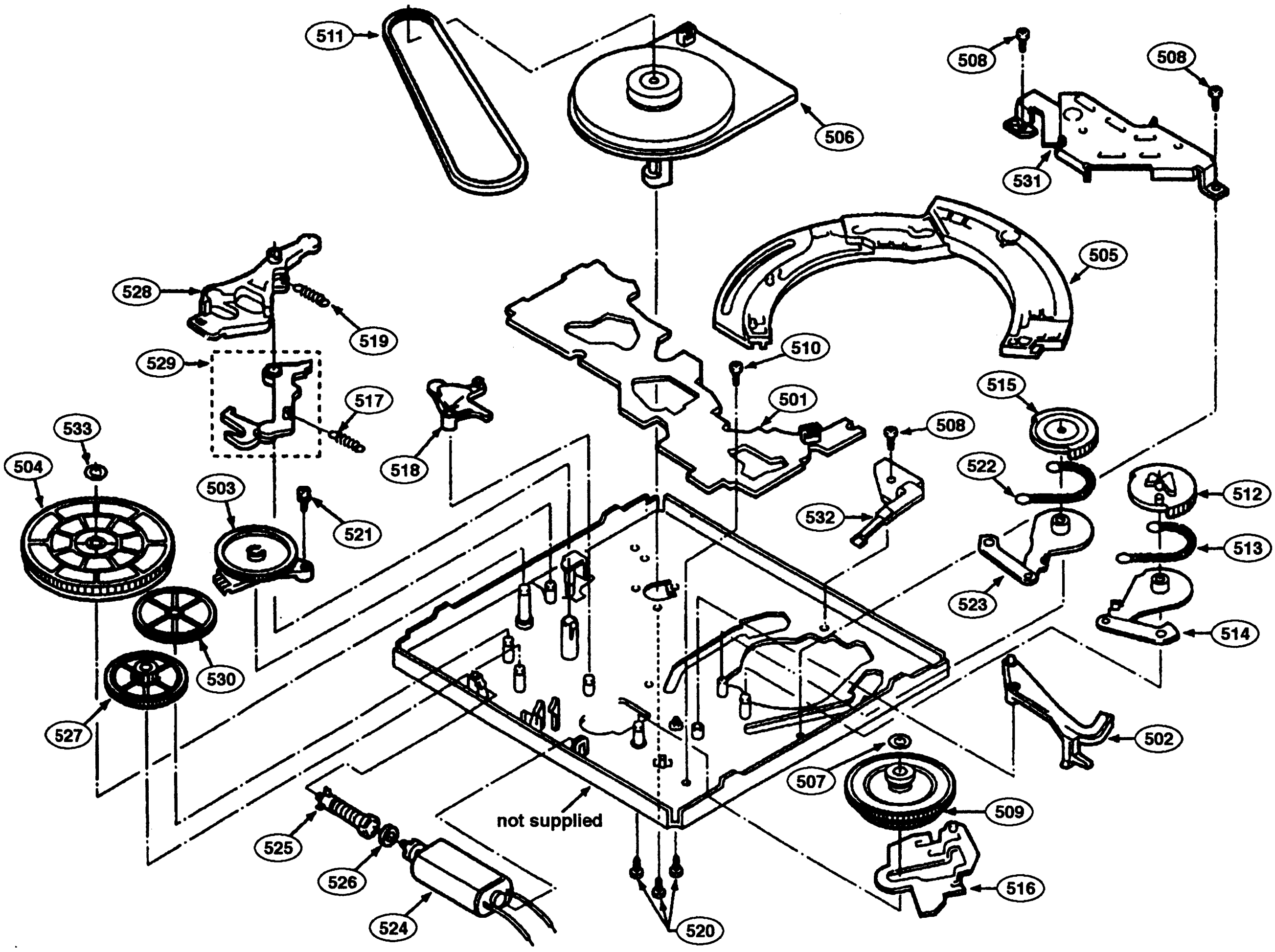
No.	Part No.	SP	Description
401	A-6779-889-A	s	LEVER ASSY
402	A-8315-818-A	s	BRAKE ASSY, CAPSTAN (TL)
403	A-8315-819-A	s	ROAD (TL) ASSY, LEVER
404	A-8315-820-A	s	GUIDE (TL) ASSY, LEVER (ACTL)
405	A-8315-821-A	s	STOPPER (TL) ASSY, LEVER
406	A-8324-047-A	s	ACE ASSY, HEAD (R/P)
407	1-810-691-11	s	PHOTO DIODE PN263L-NC
408	3-193-570-01	s	SLIT, 2.6X8X0.50 WASHER
409	3-193-648-01	s	SPRING, ACTL GUIDE (TL)
410	3-193-649-01	s	SPRING, STOPPER (TL)
411	3-193-670-01	s	SENSOR, R SPECIAL DEW
412	3-200-395-01	s	SPRING, CAPSTAN BRAKE
413	3-202-574-01	s	SPRING, FRONT RACK
414	3-203-303-01	s	GEAR, PINCH CAM (JG)
415	3-203-304-01	s	MOUNTING, OPENER (JG)
416	3-204-110-01	s	MOUNT (ASSY), LIFT (JG)
417	3-735-630-01	s	ROLLER ASSY, GUIDE
418	3-735-760-01	s	WASHER (DIA.3), SPECIAL
419	3-961-001-01	s	SPRING, T SOFT
420	3-961-008-01	s	SLIDE, T ACT BRAKE
421	3-961-021-01	s	SCREW (2.6X6), SPECIAL
422	3-961-024-01	s	LEVER ASSY, PINCH ROLLER
423	3-961-026-01	s	SPRING PINCH ROLLER
424	3-961-027-01	s	CAM, LIFT PINCH
425	3-961-030-01	s	SCREW (2.6X16), SPECIAL
426	3-961-038-01	s	SCREW (2X3), SPECIAL
427	3-961-039-01	s	MOUNT ASSY, T INC LINE
428	3-961-044-01	s	SPRING, L GUIDE LEVER
429	3-961-045-01	s	NUT (3X3), SPECIAL
430	3-961-305-01	s	GEAR, FRONT RACK
431	3-961-306-01	s	GEAR, START RACK
432	3-963-784-01	s	BRAKE (ASSY), SOFT
433	3-966-763-01	s	SCREW (2.6X12)
434	3-977-067-01	s	CLEANER (ASSY)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No.	Part No.	SP	Description
501	A-8315-778-A	o	MOUNTED CIRCUIT BOARD, MC-1
502	A-8315-822-A	s	SPRING (BT TL) ASSY, LEVER
503	1-771-864-11	s	SWITCH, JG MODE
504	3-203-302-01	s	CAM, MINE (JG)
505	3-203-305-01	s	SLIDE, CRESCENT (JG)
506	3-203-331-01	s	MOTOR, CAPSTAN (VN) DC (3W)
507	3-735-755-01	s	WASHER (DIA.2.6)
508	3-960-921-01	s	SCREW (2.6X6), SPECIAL
509	3-960-922-01	s	GEAR ASSY, FRICTION
510	3-960-925-01	s	SCREW (2.6X4), SPECIAL
511	3-960-929-01	s	BELT, REEL
512	3-960-995-01	s	GEAR, S ROAD
513	3-960-996-01	s	SPRING, S ROAD
514	3-960-997-01	s	LEVER ASSY, S ROAD
515	3-960-998-01	s	GEAR, T ROAD
516	3-961-007-01	s	SLIDE, S ACT BRAKE
517	3-961-011-01	s	SPRING, BRAKE RETURN
518	3-961-012-01	s	LEVER, CLUTCH CHANGE
519	3-961-013-01	s	SPRING, CLUTCH CHANGE
520	3-961-032-01	s	SCREW (2.6X6), SPECIAL
521	3-961-034-01	s	SCREW (2.6X8), SPECIAL
522	3-961-035-01	s	SPRING, T ROAD
523	3-961-036-01	s	LEVER ASSY, T ROAD
524	3-961-047-01	s	MOTOR ASSY, LOADING
525	3-961-048-01	s	GEAR (COMPL), WORM
526	3-961-049-01	s	DAMPER
527	3-961-050-01	s	GEAR (1), WHEEL
528	3-963-787-01	s	LEVER, CONTROL BRAKE
529	3-963-788-01	s	BAR (ASSY), ACT BRAKE LEVER
530	3-963-793-01	s	GEAR (2), WHEEL
531	3-963-796-01	s	MOUNT, CRESCENT
532	3-970-879-01	s	GROUND (ASSY), CYL
533	3-973-491-01	s	WASHER (3.6X0.5), SPECIAL

5-3. Electrical Parts List

CP-A BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-052-A	o	MOUNTED CIRCUIT BOARD, CP-A

The CP-A board includes the AD-A, SV-A and VD-A board.

AD-A BOARD

Ref. No. or Q'ty	Part No.	SP	Description
C2003	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2004	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2005	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C2006	1-162-207-31	s	CAPACITOR,CERAMIC 22PF/50V(SL)
C2009	1-124-234-00	s	CAPACITOR ELECT 22MF/16V
C2010	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
C2013	1-163-023-00	s	CAPACITOR,CHIP CERAMIC 0.015MF
C2016	1-124-259-11	s	CAPACITOR,ELECT 4.7MF/50V
C2017	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2019	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
C2020	1-162-286-31	s	CAPACITOR,CERAMIC 220PF/50V(B)
C2021	1-110-363-11	s	CAPACITOR,POLY 6800PF 100V
C2022	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C2024	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C2030	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2031	1-124-464-11	s	CAPACITOR,ELECT 0.22MF/50V
C2033	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C2035	1-124-465-00	s	CAPACITOR,ELECT 0.47MF/50V
C2037	1-161-057-00	s	CAPACITOR,CERAMIC;50V 0.033MF
C2040	1-124-229-00	s	CAPACITOR,ELECT 33MF/10V
C2041	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C2051	1-164-081-11	s	CAPACITOR,CERAMIC 470PF/50V(B)
C2091	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C2092	1-161-327-00	s	CAPACITOR,CERAMIC 0.0033MF 50V
C2101	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C2111	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2112	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C2113	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2114	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C2115	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2117	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C2118	1-162-294-31	s	CAPACITOR,CERAMIC 1000PF/50V
C2119	1-162-294-31	s	CAPACITOR,CERAMIC 1000PF/50V
C2121	1-102-106-00	s	CAPACITOR,CERAMIC;50V/100PF(B)
D2051	8-719-991-33	s	DIODE 1SS133T-77
D2052	8-719-991-33	s	DIODE 1SS133T-77
D2055	8-719-991-33	s	DIODE 1SS133T-77
D2056	8-719-991-33	s	DIODE 1SS133T-77
D2111	8-719-110-41	s	DIODE RD15ES-B2
IC201	1-810-497-11	s	IC LA7285M-TRM
IC211	1-801-984-11	s	IC LA6458D
JK201	1-784-069-11	s	JACK, HOON D3.6
JK202	1-794-475-11	s	RCA-2, JACK
L2001	1-500-128-11	s	CORE, FERRITE
L2002	1-410-087-31	s	MICRO INDUCTOR 10.0MMH
L2003	1-410-491-11	s	MICRO INDUCTOR 560UH
Q2001	1-810-471-11	s	TRANSISTOR 2SC3331-S-AA
Q2002	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2003	1-803-876-11	s	TR DTA 124EKA
Q2004	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2006	8-729-920-31	s	TRANSISTOR DTC343TK
Q2007	8-729-920-31	s	TRANSISTOR DTC343TK
Q2008	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2011	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2012	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2014	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2016	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2018	1-801-806-11	s	TRANSISTOR DTC144EAK
Q2031	1-801-806-11	s	TRANSISTOR DTC144EAK

(AD-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R2001	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R2002	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R2003	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R2004	1-216-109-00	s	RESISTOR CHIP 330K 1/10W(2012)
R2005	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2009	1-216-121-00	s	RESISTOR CHIP 1M 1/10W(2012)
R2010	1-208-810-11	s	RESISTOR,CHIP 15K 1/10W (2012)
R2011	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2012	1-208-810-11	s	RESISTOR,CHIP 15K 1/10W (2012)
R2013	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R2014	1-216-051-00	s	RESISTOR,CHIP 1.2K 1/10W(2012)
R2018	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R2021	1-216-013-00	s	RESISTOR,CHIP 33 1/10W(2012)
R2022	1-216-017-00	s	RESISTOR, CHIP 47 1/10W(2012)
R2023	1-208-810-11	s	RESISTOR,CHIP 15K 1/10W (2012)
R2024	1-216-311-00	s	RESISTOR,CHIP 6.8 1/10W(2012)
R2033	1-216-295-00	s	RESISTOR CHIP 0 1/10W(2012)
R2035	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2038	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R2042	1-216-097-00	s	RESISTOR CHIP 100K 1/10W(2012)
R2050	1-216-033-00	s	RESISTOR,CHIP 220 1/10W(2012)
R2053	1-216-093-11	s	RESISTOR, CHIP 68K
R2072	1-216-021-00	s	RESISTOR,CHIP 68 1/10W(2012)
R2080	1-216-295-00	s	RESISTOR CHIP 0 1/10W(2012)
R2091	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R2094	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R2095	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2101	1-216-091-00	s	RESISTOR CHIP 56K 1/10W(2012)
R2102	1-208-810-11	s	RESISTOR,CHIP 15K 1/10W (2012)
R2105	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R2106	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R2111	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R2112	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2113	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2114	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R2115	1-216-097-00	s	RESISTOR CHIP 100K 1/10W(2012)
R2116	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R2117	1-216-689-11	s	RESISTOR,CHIP 39K 1/10W(2012)
R2118	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R2119	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
RY201	1-755-140-11	s	RELAY
T2001	1-433-370-11	s	TRANSFORMER, OSC
VR201	1-228-997-00	s	RESISTOR,ADJ,METAL GLAZE 100K

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Ref. No. or Q'ty	Part No.	SP	Description
BZ301	1-529-113-11	s	BUZZER,PIEZO(CB13PA-X5)
C3001	1-162-207-31	s	CAPACITOR,CERAMIC 22PF/50V(SL)
C3002	1-162-207-31	s	CAPACITOR,CERAMIC 22PF/50V(SL)
C3003	1-162-207-31	s	CAPACITOR,CERAMIC 22PF/50V(SL)
C3004	1-162-207-31	s	CAPACITOR,CERAMIC 22PF/50V(SL)
C3005	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C3006	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3007	1-162-286-31	s	CAPACITOR,CERAMIC 220PF/50V(B)
C3008	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3009	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3011	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C3012	1-124-831-11	s	CAPACITOR,ELECT 4.7MF 25V
C3013	1-101-880-00	s	CAPACITOR,CERAMIC 47PF/50V
C3014	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C3015	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C3016	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3018	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3020	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C3021	1-109-952-11	s	CAPACITOR ERECT 0.47MF/50V(NP)
C3022	1-109-889-11	s	CAPACITOR ELECT 1MF/50V(BP)
C3023	1-109-889-11	s	CAPACITOR ELECT 1MF/50V(BP)
C3024	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3025	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C3026	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3028	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3029	1-161-061-11	s	CAPACITOR,CERAMIC 0.068MF/50V
C3031	1-161-061-11	s	CAPACITOR,CERAMIC 0.068MF/50V
C3032	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C3033	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C3034	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C3035	1-162-217-31	s	CAPACITOR,CERAMIC 56PF/50V(SL)
C3036	1-162-217-31	s	CAPACITOR,CERAMIC 56PF/50V(SL)
C3037	1-162-217-31	s	CAPACITOR,CERAMIC 56PF/50V(SL)
C3038	1-126-916-11	s	CAPACITOR,ELECT 1000MF/6.3V
C3039	1-124-234-00	s	CAPACITOR ELECT 22MF/16V
C3040	1-126-176-11	s	CAPACITOR,ELECT 220MF/10V
C3041	1-124-234-00	s	CAPACITOR ELECT 22MF/16V
C3042	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C3043	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3044	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3045	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C3048	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3050	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3054	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3055	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C3056	1-124-465-00	s	CAPACITOR,ELECT 0.47MF/50V
C3057	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C3058	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C3059	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C3060	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C3061	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C3062	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)
C3063	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)
C3064	1-124-234-00	s	CAPACITOR ELECT 22MF/16V
C3065	1-124-234-00	s	CAPACITOR ELECT 22MF/16V
C3066	1-126-176-11	s	CAPACITOR,ELECT 220MF/10V
C3067	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3069	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V

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Ref. No. or Q'ty	Part No.	SP	Description
C3070	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C3073	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3075	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3076	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3078	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3090	1-126-935-11	s	CAPACITOR,ELECT 470MF/16V
C3091	1-162-286-31	s	CAPACITOR,CERAMIC 220PF/50V(B)
C3101	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3102	1-124-257-00	s	CAPACITOR,ELECT 2.2MF/50V
C3110	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3120	1-126-155-11	s	CAPACITOR,ELECT 100MF/6.3V
C3121	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3122	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C3123	1-162-286-31	s	CAPACITOR,CERAMIC 220PF/50V(B)
C3130	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C3131	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3132	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3133	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3134	1-124-234-00	s	CAPACITOR ELECT 22MF/16V
C3139	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C3145	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
CN306	1-251-891-11	s	SOCKET, FFC 16P
D3001	8-719-991-33	s	DIODE 1SS133T-77
D3002	1-809-070-11	s	DIODE AK04V2
D3004	8-719-901-83	s	DIODE 1SS83
D3005	8-719-991-33	s	DIODE 1SS133T-77
D3008	8-719-109-89	s	DIODE RD5.6ES-B2
D3009	8-719-109-89	s	DIODE RD5.6ES-B2
D3010	8-719-991-33	s	DIODE 1SS133T-77
D3011	8-719-991-33	s	DIODE 1SS133T-77
D3012	8-719-991-33	s	DIODE 1SS133T-77
D3013	8-719-991-33	s	DIODE 1SS133T-77
D3014	8-719-929-15	s	DIODE HZS9.1NB2
D3015	8-719-109-89	s	DIODE RD5.6ES-B2
D3016	8-719-991-33	s	DIODE 1SS133T-77
D3020	8-719-901-83	s	DIODE 1SS83
D3030	8-719-991-33	s	DIODE 1SS133T-77
D3031	8-719-991-33	s	DIODE 1SS133T-77
D3091	8-719-991-33	s	DIODE 1SS133T-77
D3098	1-809-070-11	s	DIODE AK04V2
D3101	8-719-901-83	s	DIODE 1SS83
D3102	8-719-901-83	s	DIODE 1SS83
D3103	8-719-921-40	s	DIODE MTZJ4.7C
D3104	8-719-110-49	s	DIODE RD18ES-B2
IC301	1-803-990-11	s	IC UPD790006GF-P02-3BA
IC302	1-803-991-11	s	IC PST9128NR
IC303	8-759-353-59	s	IC LB1643
IC304	8-759-822-35	s	IC LA7116
IC305	1-803-879-11	s	IC AT24C08-10PC
IC306	1-801-356-11	s	IC MN1381-R
IC308	1-803-026-11	s	IC TC4030BP TSB
IC309	1-803-992-11	s	IC TC4S81F
JK301	1-784-071-11	s	JACK, HOON D3.6
Q3001	8-729-205-97	s	TRANSISTOR 2SC3668-Y
Q3002	8-729-205-97	s	TRANSISTOR 2SC3668-Y
Q3003	8-729-205-97	s	TRANSISTOR 2SC3668-Y
Q3004	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q3005	8-729-205-97	s	TRANSISTOR 2SC3668-Y
Q3010	1-801-806-11	s	TRANSISTOR DTC144EAK

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Ref. No. or Q'ty	Part No.	SP	Description
Q3011	1-803-875-11	s	TR DTC114EKA
Q3091	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q3101	1-801-806-11	s	TRANSISTOR DTC144EAK
Q3102	8-729-027-23	s	TRANSISTOR DTA114EKA-T146
Q3103	1-803-993-11	s	TR DTD113ZK
Q3104	1-801-806-11	s	TRANSISTOR DTC144EAK
Q3105	8-729-027-23	s	TRANSISTOR DTA114EKA-T146
Q3106	1-801-806-11	s	TRANSISTOR DTC144EAK
Q3107	1-801-806-11	s	TRANSISTOR DTC144EAK
R3001	1-216-109-00	s	RESISTOR CHIP 330K 1/10W(2012)
R3002	1-216-119-00	s	RESISTOR,CHIP 820K 1/10W(2012)
R3003	1-216-083-00	s	RESISTOR CHIP 27K 1/10W(2012)
R3004	1-216-107-00	s	RESISTOR,CHIP 270K 1/10W(2012)
R3005	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R3006	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R3007	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3008	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3009	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3010	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3011	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3012	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3013	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3014	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3016	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3017	1-216-078-00	s	RESISTOR,CHIP 16K 1/10W(2012)
R3018	1-216-078-00	s	RESISTOR,CHIP 16K 1/10W(2012)
R3020	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3021	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3023	1-216-045-00	s	RESISTOR,CHIP 680 1/10W(2012)
R3024	1-216-045-00	s	RESISTOR,CHIP 680 1/10W(2012)
R3026	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3027	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R3028	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R3029	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R3031	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3033	1-216-085-00	s	RESISTOR CHIP 33K 1/10W(2012)
R3034	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3036	1-216-085-00	s	RESISTOR CHIP 33K 1/10W(2012)
R3037	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3038	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3039	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3040	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3041	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3042	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3043	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R3044	1-249-415-11	s	RES,CARBON 680 1/4W (SMALL)
R3045	1-249-415-11	s	RES,CARBON 680 1/4W (SMALL)
R3046	1-216-109-00	s	RESISTOR CHIP 330K 1/10W(2012)
R3053	1-216-055-00	s	RESISTOR CHIP 1.8K 1/10W(2012)
R3055	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3056	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3057	1-216-069-11	s	RESISTOR,CHIP 6.8K 1/10W(2012)
R3058	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R3059	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R3060	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R3061	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3062	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3063	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3064	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)

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Ref. No. or Q'ty	Part No.	SP	Description
R3065	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3066	1-216-105-00	s	RESISTOR,CHIP 220K 1/10W(2012)
R3067	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3068	1-216-105-00	s	RESISTOR,CHIP 220K 1/10W(2012)
R3069	1-249-413-11	s	RES,CARBON 470 1/4W SMALL
R3070	1-249-415-11	s	RES,CARBON 680 1/4W (SMALL)
R3071	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3073	1-216-109-00	s	RESISTOR CHIP 330K 1/10W(2012)
R3074	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3075	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3077	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3078	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3079	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3080	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R3083	1-216-061-00	s	RESISTOR CHIP 3.3K 1/10W(2012)
R3084	1-216-059-00	s	RESISTOR,CHIP 2.7K 1/10W(2012)
R3085	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3086	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3087	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3091	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R3092	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R3093	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3094	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3095	1-216-064-00	s	RESISTOR,CHIP 4.3K 1/10W(2012)
R3096	1-216-064-00	s	RESISTOR,CHIP 4.3K 1/10W(2012)
R3097	1-216-064-00	s	RESISTOR,CHIP 4.3K 1/10W(2012)
R3101	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R3102	1-216-051-00	s	RESISTOR,CHIP 1.2K 1/10W(2012)
R3103	1-216-059-00	s	RESISTOR,CHIP 2.7K 1/10W(2012)
R3104	⚠ 1-212-946-11	s	RESISTOR,FUSE 3.3 1/2W
R3105	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3106	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3120	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3121	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R3122	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3123	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3124	1-249-411-11	s	RES,CARBON 330 1/4W SMALL
R3126	1-249-411-11	s	RES,CARBON 330 1/4W SMALL
R3127	1-249-401-11	s	RES,CARBON 47 1/4W (SMALL)
R3128	1-249-401-11	s	RES,CARBON 47 1/4W (SMALL)
R3130	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3131	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3139	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R3140	1-249-409-11	s	RES,CARBON 220 1/4W (SMALL)
R3141	1-216-069-11	s	RESISTOR,CHIP 6.8K 1/10W(2012)
R3142	1-216-677-11	s	RESISTOR,CHIP 12K 1/10W(2012)
R3143	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R3144	1-216-295-00	s	RESISTOR CHIP 0 1/10W(2012)
R3145	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R3148	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R3153	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
X3001	1-579-220-11	s	CRYSTAL,OSC 32KHZ
X3002	1-767-200-11	s	CRYSTAL OSC

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Ref. No. or Q'ty	Part No.	SP	Description
C1001	1-115-789-11	s	CAPACITOR ELECT 1000MF/25V 105
C1002	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1003	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1005	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
C1006	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1007	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1043	1-107-906-11	s	CAPACITOR,ELECT 10MF/50V(105)
C1051	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1052	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1053	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1054	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1055	1-161-056-00	s	CAPACITOR,CERAMIC;50V 0.027MF
C1057	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1058	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1059	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1060	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1061	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1062	1-161-057-00	s	CAPACITOR,CERAMIC;50V 0.033MF
C1071	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1072	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1073	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1074	1-162-219-31	s	CAPACITOR,CERAMIC 68PF/50V(SL)
C1075	1-102-822-00	s	CAPACITOR,CERAMIC;50V/390PF
C1076	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1078	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1081	1-102-976-00	s	CAPACITOR,CERAMIC 180PF/50V SL
C1082	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1101	1-162-201-31	s	CAPACITOR,CERAMIC 12PF/50V SL
C1102	1-162-286-31	s	CAPACITOR,CERAMIC 220PF/50V(B)
C1103	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1104	1-162-280-31	s	CAPACITOR,CERAMIC 82PF/50V(B)
C1105	1-124-465-00	s	CAPACITOR,ELECT 0.47MF/50V
C1106	1-162-195-31	s	CAPACITOR,CERAMIC 4.7PF/50V
C1107	1-102-822-00	s	CAPACITOR,CERAMIC;50V/390PF
C1108	1-162-195-31	s	CAPACITOR,CERAMIC 4.7PF/50V
C1109	1-162-280-31	s	CAPACITOR,CERAMIC 82PF/50V(B)
C1110	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1111	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1112	1-162-291-31	s	CAPACITOR,CERAMIC 560PF/50V(B)
C1113	1-124-465-00	s	CAPACITOR,ELECT 0.47MF/50V
C1114	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1115	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1116	1-162-287-31	s	CAPACITOR,CERAMIC 270PF/50V(B)
C1117	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1118	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1119	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1120	1-161-055-00	s	CAPACITOR,CERAMIC;50V 0.022MF
C1122	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1123	1-124-257-00	s	CAPACITOR,ELECT 2.2MF/50V
C1124	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1125	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1126	1-161-055-00	s	CAPACITOR,CERAMIC;50V 0.022MF
C1128	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1129	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1130	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1131	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1133	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1134	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1135	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)

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Ref. No. or Q'ty	Part No.	SP	Description
C1140	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1141	1-162-209-31	s	CAPACITOR,CERAMIC 27PF/50V(SL)
C1146	1-162-201-31	s	CAPACITOR,CERAMIC 12PF/50V SL
C1147	1-161-055-00	s	CAPACITOR,CERAMIC;50V 0.022MF
C1148	1-161-057-00	s	CAPACITOR,CERAMIC;50V 0.033MF
C1149	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1150	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1152	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1154	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1155	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1351	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1353	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1355	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1356	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1357	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1358	1-163-017-00	s	CAPACITOR,CHIP CERAMIC 4700PF
C1359	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1360	1-161-063-00	s	CAPACITOR,CERAMIC 0.1MF/50V
C1361	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1362	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1363	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1365	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1371	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1372	1-101-880-00	s	CAPACITOR,CERAMIC 47PF/50V
C1373	1-163-107-00	s	CAPACITOR,CHIP CERAMIC 39PF/50
C1374	1-101-880-00	s	CAPACITOR,CERAMIC 47PF/50V
C1381	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1384	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1385	1-162-208-31	s	CAPACITOR,CERAMIC 24PF/50V(SL)
C1386	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)
C1391	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1601	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1602	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1603	1-102-106-00	s	CAPACITOR,CERAMIC;50V/100PF(B)
C1605	1-162-294-31	s	CAPACITOR,CERAMIC 1000PF/50V
C1606	1-124-259-11	s	CAPACITOR,ELECT 4.7MF/50V
C1608	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1610	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)
C1611	1-101-880-00	s	CAPACITOR,CERAMIC 47PF/50V
C1612	1-164-087-11	s	CAPACITOR,CERAMIC 0.0015MF/50V
C1613	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1614	1-162-217-31	s	CAPACITOR,CERAMIC 56PF/50V(SL)
C1616	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1617	1-102-106-00	s	CAPACITOR,CERAMIC;50V/100PF(B)
C1620	1-163-107-00	s	CAPACITOR,CHIP CERAMIC 39PF/50
D1051	8-719-109-89	s	DIODE RD5.6ES-B2
D1054	8-719-109-89	s	DIODE RD5.6ES-B2
D1055	8-719-991-33	s	DIODE 1SS133T-77
D1102	8-719-991-33	s	DIODE 1SS133T-77
D1104	8-719-991-33	s	DIODE 1SS133T-77
D1105	8-719-991-33	s	DIODE 1SS133T-77
D1150	8-719-991-33	s	DIODE 1SS133T-77
D1151	8-719-991-33	s	DIODE 1SS133T-77
D1602	8-719-991-33	s	DIODE 1SS133T-77
D1603	8-719-991-33	s	DIODE 1SS133T-77
IC111	1-803-881-11	s	IC LA7195
IC135	1-801-807-11	s	IC TL8850AP
IC161	8-752-031-49	s	IC CXA1203M

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Ref. No. or Q'ty	Part No.	SP	Description
JK101	1-251-892-11	s	SOCKET, BNC
JK102	1-251-892-11	s	SOCKET, BNC
L1071	1-408-104-00	s	INDUCTOR,1000UH
L1072	1-410-525-11	s	MICRO INDUCTOR 220UH
L1073	1-410-335-11	s	MICRO INDUCTOR 150UH
L1081	1-410-515-11	s	MICRO INDUCTOR 33UH
L1101	1-410-521-11	s	MICRO INDUCTOR 100UH
L1102	1-414-540-11	s	INDUCTOR 1.1UH
L1104	1-410-501-11	s	MICRO INDUCTOR 2.2UH
L1105	1-410-324-11	s	MICRO INDUCTOR 4.7UH
L1353	1-414-540-11	s	INDUCTOR 1.1UH
L1355	1-414-540-11	s	INDUCTOR 1.1UH
L1371	1-410-512-11	s	MICRO INDUCTOR 18UH
L1382	1-410-522-11	s	MICRO INDUCTOR 120UH
L1601	1-410-509-11	s	MICRO INDUCTOR 10UH
Q1001	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1002	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1003	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1004	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1005	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1007	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1021	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1022	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1023	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1051	8-729-205-97	s	TRANSISTOR 2SC3668-Y
Q1052	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1053	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1054	8-729-205-97	s	TRANSISTOR 2SC3668-Y
Q1055	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1056	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1071	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1072	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1073	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1081	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1085	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1086	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1101	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1102	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1103	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1104	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1106	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1371	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1372	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1381	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1382	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1391	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1392	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1393	8-729-027-38	s	TRANSISTOR DTA144EAK-T146
Q1601	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1602	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1603	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1610	1-801-806-11	s	TRANSISTOR DTC144EAK
Q1611	1-801-806-11	s	TRANSISTOR DTC144EAK
R1001	1-216-022-00	s	RESISTOR,CHIP 75 1/10W (2125)
R1002	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1003	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1004	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1005	1-216-013-00	s	RESISTOR,CHIP 33 1/10W(2012)
R1006	1-216-093-11	s	RESISTOR, CHIP 68K
R1007	1-216-091-00	s	RESISTOR CHIP 56K 1/10W(2012)

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Ref. No. or Q'ty	Part No.	SP	Description
R1008	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1009	1-216-045-00	s	RESISTOR,CHIP 680 1/10W(2012)
R1010	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1011	1-216-059-00	s	RESISTOR,CHIP 2.7K 1/10W(2012)
R1012	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R1013	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R1014	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1015	1-216-022-00	s	RESISTOR,CHIP 75 1/10W (2125)
R1016	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1021	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1022	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1023	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1051	1-216-045-00	s	RESISTOR,CHIP 680 1/10W(2012)
R1052	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1053	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1054	1-249-415-11	s	RES,CARBON 680 1/4W (SMALL)
R1055	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1056	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1058	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1059	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1071	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1072	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1073	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1074	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1075	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R1076	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1081	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R1085	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1101	1-216-061-00	s	RESISTOR CHIP 3.3K 1/10W(2012)
R1102	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R1103	1-216-059-00	s	RESISTOR,CHIP 2.7K 1/10W(2012)
R1104	1-216-055-00	s	RESISTOR CHIP 1.8K 1/10W(2012)
R1105	1-216-051-00	s	RESISTOR,CHIP 1.2K 1/10W(2012)
R1106	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R1107	1-216-059-00	s	RESISTOR,CHIP 2.7K 1/10W(2012)
R1108	1-216-045-00	s	RESISTOR,CHIP 680 1/10W(2012)
R1109	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R1111	1-216-121-00	s	RESISTOR CHIP 1M 1/10W(2012)
R1112	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1113	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1114	1-208-810-11	s	RESISTOR,CHIP 15K 1/10W (2012)
R1115	1-216-055-00	s	RESISTOR CHIP 1.8K 1/10W(2012)
R1116	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1118	1-216-295-91	s	RESISTOR, CHIP 0 (1/10W)
R1119	1-216-051-00	s	RESISTOR,CHIP 1.2K 1/10W(2012)
R1120	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1121	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1122	1-216-055-00	s	RESISTOR CHIP 1.8K 1/10W(2012)
R1123	1-216-037-00	s	RESISTOR,CHIP 330 1/10W(2012)
R1124	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R1125	1-216-677-11	s	RESISTOR,CHIP 12K 1/10W(2012)
R1126	1-216-085-00	s	RESISTOR CHIP 33K 1/10W(2012)
R1127	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1128	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1129	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1133	1-216-085-00	s	RESISTOR CHIP 33K 1/10W(2012)
R1134	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1135	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1136	1-216-039-00	s	RESISTOR, CHIP 390 1/10W(2012)

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Ref. No. or Q'ty	Part No.	SP	Description
R1137	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1351	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1352	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1353	1-216-047-00	s	RESISTOR, CHIP 820 1/10W(2012)
R1366	1-216-295-91	s	RESISTOR, CHIP 0 (1/10W)
R1371	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1372	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1373	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1374	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1381	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1382	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1383	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R1384	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1391	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1601	1-216-041-11	s	RES, CHIP
R1603	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1604	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1606	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1607	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1608	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1611	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1612	1-216-109-00	s	RESISTOR CHIP 330K 1/10W(2012)
R1613	1-216-101-00	s	RESISTOR CHIP 150K 1/10W(2012)
R1614	1-216-037-00	s	RESISTOR,CHIP 330 1/10W(2012)
R1615	1-216-097-00	s	RESISTOR CHIP 100K 1/10W(2012)
R1616	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R1617	1-216-051-00	s	RESISTOR,CHIP 1.2K 1/10W(2012)
R1618	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R1619	1-216-035-00	s	RESISTOR, CHIP 270 1/10W(2012)
R1621	1-216-037-00	s	RESISTOR,CHIP 330 1/10W(2012)
R1627	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
RY101	1-755-140-11	s	RELAY
VR101	1-228-991-00	s	RESISTOR,ADJ 2.2K
VR111	1-228-995-00	s	RESISTOR,ADJ,METAL GLAZE 22K
VR112	1-228-991-00	s	RESISTOR,ADJ 2.2K
VR113	1-228-993-00	s	RESISTOR,ADJ,METAL GLAZE 4.7K
VR114	1-228-994-00	s	RESISTOR,ADJ,METAL GLAZE 10K
X1101	1-577-667-11	s	CRYSTAL OSCILLATOR

CT-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-058-A	o	MOUNTED CIRCUIT BOARD, CT-1
1pc	3-203-307-01	o	HOLDER
C0001	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C0002	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C0003	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C0004	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C0005	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
C0006	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0007	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C0008	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C0010	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0011	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0012	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0013	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C0014	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0018	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0019	1-164-004-11	s	CAPACITOR,CERAMIC 0.1MF/25V
C0022	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
D0001	8-719-991-33	s	DIODE 1SS133T-77
D0002	8-719-991-33	s	DIODE 1SS133T-77
D0003	8-719-991-33	s	DIODE 1SS133T-77
D0004	8-719-991-33	s	DIODE 1SS133T-77
D0005	8-719-991-33	s	DIODE 1SS133T-77
F0001	1-233-590-11	s	FILTER DSS306-91B101M
F0002	1-233-590-11	s	FILTER DSS306-91B101M
F0003	1-233-590-11	s	FILTER DSS306-91B101M
IC001	8-759-252-59	s	IC MAX202CSE
IC002	1-803-981-11	s	IC LC87F5064A-F5N45
IC003	1-801-356-11	s	IC MN1381-R
IC004	8-759-140-53	s	IC UPD4053BC
IC005	1-803-882-11	s	IC MAX3082CSA
JK002	1-794-476-11	s	JACK, MODULAR 4(6-2)
JK003	1-794-476-11	s	JACK, MODULAR 4(6-2)
R0001	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0002	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0003	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0004	1-218-147-11	s	RESISTOR,CHIP 750 1/10W (2012)
R0005	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0006	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0007	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0008	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0009	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0010	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0011	1-249-406-11	s	RES,CARBON 120 1/4W SMALL
R0012	1-216-113-00	s	RESISTOR CHIP 470K 1/10W(2012)
R0013	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0014	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R0015	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R0017	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0018	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0019	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0020	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0021	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0022	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0023	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0024	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0025	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R0026	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
S0001	1-771-863-11	s	SWITCH, DIP IP-ITX10

(CT-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
X0001	1-781-722-11	s	OSCILLATOR, CERAMIC 10MHZ OSC

MC-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8315-778-A	o	MOUNTED CIRCUIT BOARD, MC-1
C8001	1-164-159-21	s	CAPACITOR,CERAMIC 0.1MF(S-)
R8003	1-249-410-11	s	RES,CARBON 270 1/4W (SMALL)
R8004	1-249-407-11	s	RES,CARBON 150 1/4W (SMALL)
R8005	1-249-410-11	s	RES,CARBON 270 1/4W (SMALL)
S8002	1-762-173-11	s	SWITCH, EP (1P-1T)

PW-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-056-A	o	MOUNTED CIRCUIT BOARD, PW-1
C5001	⚠ 1-136-188-11	s	CAPACITOR,FILM 0.068MF/250V
C5002	⚠ 1-136-188-11	s	CAPACITOR,FILM 0.068MF/250V
C5005	⚠ 1-115-383-11	s	CAPACITOR, CERAMIC 1000PF/400V
C5007	⚠ 1-115-383-11	s	CAPACITOR, CERAMIC 1000PF/400V
C5010	1-125-554-11	s	CAPACITOR ELECT 47MF/400V
C5011	1-124-257-00	s	CAPACITOR,ELECT 2.2MF/50V
C5012	1-110-974-11	s	CAPACITOR,CERAMIC 3300PF 500V
C5014	1-130-495-11	s	CAPACITOR,FILM 0.1MF/50V
C5019	1-102-822-00	s	CAPACITOR,CERAMIC;50V/390PF
C5020	1-115-678-11	s	CAPACITOR, CERAMIC 47PF/1KV
C5101	1-135-413-11	s	CAPACITOR,ELECT 1000MF 6.3V
C5102	1-135-413-11	s	CAPACITOR,ELECT 1000MF 6.3V
C5103	1-115-789-11	s	CAPACITOR ELECT 1000MF/25V 105
C5104	1-115-789-11	s	CAPACITOR ELECT 1000MF/25V 105
C5108	1-126-967-11	s	CAPACITOR,ELECT 47MF/50V
C5109	1-126-947-11	s	CAPACITOR, ELECT 47MF/35V
C5110	1-126-176-11	s	CAPACITOR,ELECT 220MF/10V
C5111	1-130-495-11	s	CAPACITOR,FILM 0.1MF/50V
C5119	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
C5124	1-126-959-11	s	CAPCITOR ERECT 0.47/50V
C5130	1-115-677-11	s	CAPACITOR,CERAMIC 470PF/500V
CN501	⚠ 1-251-828-11	s	SOCKET,AC INLET
D5001	1-801-763-11	s	DIODE DB155G-S
D5003	8-719-901-83	s	DIODE 1SS83
D5006	8-719-901-83	s	DIODE 1SS83
D5010	1-808-898-11	s	DIODE AP01C-V0
D5011	8-719-901-83	s	DIODE 1SS83
D5012	1-803-877-11	s	DI 1.5KE 150A
D5013	⚠ 1-810-884-11	s	PHOTO COUPLER PC123U2
D5101	1-803-251-11	s	DIODE SF-24
D5104	1-803-251-11	s	DIODE SF-24
D5105	8-719-901-83	s	DIODE 1SS83
D5106	8-719-901-83	s	DIODE 1SS83
D5107	1-808-899-11	s	DIODE AG01-V2
D5108	8-719-921-40	s	DIODE MTZJ4.7C
D5110	8-719-109-93	s	DIODE RD6.2ES-B2
D5112	8-719-901-83	s	DIODE 1SS83
F5001	⚠ 1-532-297-11	s	FUSE,QUICK-ACTING 2.5A/250V
IC511	1-810-060-11	s	IC L5431-AA
IC513	1-810-060-11	s	IC L5431-AA
L5001	⚠ 1-411-767-11	o	FILTER, LINE
L5010	1-414-540-11	s	INDUCTOR 1.1UH
L5011	1-414-540-11	s	INDUCTOR 1.1UH
L5012	1-414-540-11	s	INDUCTOR 1.1UH
L5013	1-414-540-11	s	INDUCTOR 1.1UH
L5101	1-410-509-11	s	MICRO INDUCTOR 10UH
L5102	1-410-509-11	s	MICRO INDUCTOR 10UH
L5201	1-414-540-11	s	INDUCTOR 1.1UH
L5202	1-414-540-11	s	INDUCTOR 1.1UH
L5203	1-414-540-11	s	INDUCTOR 1.1UH
L5204	1-414-540-11	s	INDUCTOR 1.1UH
L5205	1-414-540-11	s	INDUCTOR 1.1UH
PR511	⚠ 1-533-611-11	s	PROTECTOR, IC 1.0A 50V
PR512	⚠ 1-533-611-11	s	PROTECTOR, IC 1.0A 50V
Q5002	1-809-602-11	s	TRANSISTOR 2SC2274-F-AA
Q5003	8-729-140-97	s	TRANSISTOR 2SB734-34
Q5004	1-809-602-11	s	TRANSISTOR 2SC2274-F-AA
Q5010	8-729-027-98	s	TRANSISTOR 2SK1460LS
Q5140	8-729-024-68	s	TRANSISTOR 2SD1801-S
Q5141	8-729-029-56	s	TRANSISTOR DTA144ESA
Q5142	8-729-030-02	s	TRANSISTOR DTC144ESA
R5001	⚠ 1-202-724-11	s	RESISTOR,SOLID 2.7M 1/2W
R5002	1-247-889-00	s	RESISTOR,CARBON 270K 1/4W
R5003	1-247-889-00	s	RESISTOR,CARBON 270K 1/4W
R5004	1-247-889-00	s	RESISTOR,CARBON 270K 1/4W
R5010	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R5011	1-216-031-00	s	RESISTOR,CHIP 180 1/10W(2012)
R5012	1-216-109-00	s	RESISTOR CHIP 330K 1/10W(2012)
R5013	1-216-055-00	s	RESISTOR CHIP 1.8K 1/10W(2012)
R5014	1-216-093-11	s	RESISTOR, CHIP 68K
R5015	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R5101	1-216-037-00	s	RESISTOR,CHIP 330 1/10W(2012)
R5102	1-216-033-00	s	RESISTOR,CHIP 220 1/10W(2012)
R5103	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R5104	1-249-427-11	s	RES,CARBON 6.8K 1/4W (SMALL)
R5111	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R5114	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R5122	1-249-391-11	s	RES,CARBON 6.8 1/4W
R5123	1-216-055-00	s	RESISTOR CHIP 1.8K 1/10W(2012)
R5140	1-249-419-11	s	RES,CARBON 1.5K 1/4W SMALL
R5141	1-249-419-11	s	RES,CARBON 1.5K 1/4W SMALL
R5142	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R5143	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R5144	1-216-295-00	s	RESISTOR CHIP 0 1/10W(2012)
R5145	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R5150	1-216-017-00	s	RESISTOR, CHIP 47 1/10W(2012)
T5001	⚠ 1-431-151-11	s	TRANSFORMER, PULSE POWER
VA501	⚠ 1-801-123-11	s	VARISTOR ENC4710D-05AS6
Y5001	1-533-583-11	s	FUSE,HOLDER
Y5002	1-533-583-11	s	FUSE,HOLDER

TB-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-060-A	o	MOUNTED CIRCUIT BOARD, TB-1
C8501	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C8502	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C8702	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
C8703	1-163-009-11	s	CAPACITOR,CERAMIC 1000PF/50V
CN852	1-649-506-11	o	TERMINAL, BOARD
CN854	1-649-506-11	o	TERMINAL, BOARD
D8501	8-719-991-33	s	DIODE 1SS133T-77
D8502	8-719-991-33	s	DIODE 1SS133T-77
L8559	1-414-540-11	s	INDUCTOR 1.1UH
L8563	1-414-540-11	s	INDUCTOR 1.1UH
L8760	1-414-540-11	s	INDUCTOR 1.1UH
L8761	1-414-540-11	s	INDUCTOR 1.1UH
Q8501	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q8503	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q8504	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q8505	1-801-806-11	s	TRANSISTOR DTC144EAK
Q8506	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q8507	1-801-806-11	s	TRANSISTOR DTC144EAK
Q8508	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q8509	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q8704	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q8706	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q8708	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q8709	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
R8501	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8502	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8503	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8504	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8505	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8506	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8508	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8509	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8510	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8511	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8512	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8513	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8514	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8515	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8516	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8517	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8518	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8519	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8520	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8521	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8522	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8523	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8524	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8525	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8526	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8527	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8528	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8529	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8551	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8552	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8553	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8554	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8555	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8556	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8716	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8717	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8718	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8719	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8720	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8721	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8723	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8724	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8725	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8726	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8727	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8728	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8729	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8730	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R8732	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R8733	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R8754	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8755	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8756	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R8757	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)

TB-2 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-057-A	o	MOUNTED CIRCUIT BOARD, TB-2
1pc	3-193-642-01	o	HOLDER
Z8901 ⚠	1-756-091-11	s	BATTERY, CHARGE

TM-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-064-A	o	MOUNTED CIRCUIT BOARD, TM-1
C7103	1-124-589-11	s	CAPACITOR,ELECT 47MF/16V
C7104	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C7105	1-164-159-21	s	CAPACITOR,CERAMIC 0.1MF(S-)
C7108	1-102-973-00	s	CAPACITOR,CERAMIC 10PF/50V(SL)
C7110	1-162-291-31	s	CAPACITOR,CERAMIC 560PF/50V(B)
C7111	1-162-291-31	s	CAPACITOR,CERAMIC 560PF/50V(B)
C7112	1-162-291-31	s	CAPACITOR,CERAMIC 560PF/50V(B)
C7113	1-162-291-31	s	CAPACITOR,CERAMIC 560PF/50V(B)
CN711	1-251-893-11	s	SOCKET, FFC 16P
D7101	8-719-078-45	s	DIODE GMA01U-BT
D7102	8-719-078-45	s	DIODE GMA01U-BT
D7103	8-719-078-45	s	DIODE GMA01U-BT
D7106	8-719-078-45	s	DIODE GMA01U-BT
D7107	8-719-078-45	s	DIODE GMA01U-BT
D7109	8-719-078-45	s	DIODE GMA01U-BT
D7112	8-719-078-45	s	DIODE GMA01U-BT
D7114	8-719-078-45	s	DIODE GMA01U-BT
D7115	8-719-078-45	s	DIODE GMA01U-BT
D7116	8-719-078-45	s	DIODE GMA01U-BT
D7117	8-719-078-45	s	DIODE GMA01U-BT
D7130	8-719-901-83	s	DIODE 1SS83
D7133	8-719-078-45	s	DIODE GMA01U-BT
D7136	8-719-078-45	s	DIODE GMA01U-BT
D7138	8-719-078-45	s	DIODE GMA01U-BT
D7142	8-719-078-45	s	DIODE GMA01U-BT
D7150	8-719-301-58	s	LED SEL2910D-D
D7151	1-809-687-11	s	LED SEL2410G-TP2-D
D7152	8-719-301-58	s	LED SEL2910D-D
IC711	1-801-355-11	s	IC MN12510
Q7130	8-729-900-45	s	TRANSISTOR DTC114EF
Q7132	8-729-900-45	s	TRANSISTOR DTC114EF
R7102	1-249-414-11	s	RES,CARBON 560 1/4W (SMALL)
R7103	1-249-414-11	s	RES,CARBON 560 1/4W (SMALL)
R7104	1-249-414-11	s	RES,CARBON 560 1/4W (SMALL)
R7105	1-249-414-11	s	RES,CARBON 560 1/4W (SMALL)
R7106	1-249-439-11	s	RES,CARBON 68K 1/4W
R7107	1-249-439-11	s	RES,CARBON 68K 1/4W
R7108	1-249-439-11	s	RES,CARBON 68K 1/4W
R7109	1-249-439-11	s	RES,CARBON 68K 1/4W
R7114	1-249-439-11	s	RES,CARBON 68K 1/4W
R7115	1-249-439-11	s	RES,CARBON 68K 1/4W
R7116	1-249-439-11	s	RES,CARBON 68K 1/4W
R7117	1-249-439-11	s	RES,CARBON 68K 1/4W
R7118	1-249-439-11	s	RES,CARBON 68K 1/4W
R7120	1-249-425-11	s	RES,CARBON 4.7K 1/4W SMALL
R7121	1-249-425-11	s	RES,CARBON 4.7K 1/4W SMALL
R7122	1-249-439-11	s	RES,CARBON 68K 1/4W
R7123	1-249-439-11	s	RES,CARBON 68K 1/4W
R7124	1-249-439-11	s	RES,CARBON 68K 1/4W
R7125	1-249-439-11	s	RES,CARBON 68K 1/4W
R7130	1-249-408-11	s	RES,CARBON 180 1/4W (SMALL)
R7131	1-249-407-11	s	RES,CARBON 150 1/4W (SMALL)
R7132	1-249-408-11	s	RES,CARBON 180 1/4W (SMALL)
S7101	1-762-802-11	s	SWITCH, SLIDE (2P-2T)
S7102	1-762-802-11	s	SWITCH, SLIDE (2P-2T)
S7103	1-762-802-11	s	SWITCH, SLIDE (2P-2T)

(TM-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
S7104	1-762-802-11	s	SWITCH, SLIDE (2P-2T)
S7106	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7107	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7108	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7111	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7113	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7114	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7116	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7118	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7119	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7120	1-762-304-11	s	SWITCH, PUSH (1P-1T)
X7101	1-233-491-11	s	CERAMIC OSC 4.000MHZ

TM-2 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-063-A	o	MOUNTED CIRCUIT BOARD, TM-2
CN721	1-251-894-11	s	SOCKET, 10P
S7201	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7202	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7203	1-762-303-11	s	SWITCH, PUSH (1P-1T)
S7204	1-762-303-11	s	SWITCH, PUSH (1P-1T)
S7205	1-762-303-11	s	SWITCH, PUSH (1P-1T)
S7206	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7207	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7208	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7209	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7210	1-762-303-11	s	SWITCH, PUSH (1P-1T)

VD-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-061-A	o	MOUNTED CIRCUIT BOARD, VD-1
C1501	1-124-259-11	s	CAPACITOR,ELECT 4.7MF/50V
C1502	1-126-162-11	s	CAPACITOR,ELECT 3.3MF/50V
C1503	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1504	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1505	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1506	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1507	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1508	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1509	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1512	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1522	1-109-889-11	s	CAPACITOR ELECT 1MF/50V(BP)
C1523	1-162-292-31	s	CAPACITOR,CERAMIC 680PF/50V
C1524	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1525	1-130-475-00	s	CAPACITOR FILM 0.0022MF/50V
C1526	1-102-106-00	s	CAPACITOR,CERAMIC;50V/100PF(B)
C1527	1-162-288-31	s	CAPACITOR,CERAMIC 330PF/50V(B)
C1528	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1529	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1530	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1531	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1532	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1537	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1554	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1555	1-101-880-00	s	CAPACITOR,CERAMIC 47PF/50V
C1556	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1557	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1558	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1561	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1562	1-161-059-00	s	CAPACITOR,CERAMIC;50V 0.047MF
C1563	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1566	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1567	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1568	1-104-942-11	s	CAPACITOR,ELECT 1MF/50V(AU)
C1569	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1570	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1581	1-124-259-11	s	CAPACITOR,ELECT 4.7MF/50V
C1582	1-124-767-00	s	CAPACITOR,ELECT 2.2MF/50V(NP)
C1583	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1584	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1591	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1592	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
IC151	1-803-883-11	s	IC LA7277M
IC152	8-759-514-54	s	IC BA7046
IC153	1-801-809-11	s	IC NJM2249L
IC154	8-759-032-01	s	IC MC74HC00AF
IC155	1-803-884-11	s	IC M35061-002SP
IC159	8-759-635-31	s	IC M50253P
L1567	1-414-142-11	s	MICRO INDUCTOR 1 UH
Q1540	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1581	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1582	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1583	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
R1501	1-227-161-11	s	RESISTOR 10K
R1502	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1503	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1505	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1506	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1507	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1508	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1522	1-216-041-11	s	RES, CHIP
R1523	1-216-115-00	s	RESISTOR,CHIP 560K 1/10W(2012)
R1524	1-216-081-00	s	RESISTOR,CHIP 22K 1/10W(2012)
R1525	1-216-113-00	s	RESISTOR CHIP 470K 1/10W(2012)
R1526	1-214-780-00	s	RESISTOR,METAL FILM 130K 1/4W
R1527	1-216-063-00	s	RESISTOR,CHIP 3.9K 1/10W(2012)
R1531	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1532	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1533	1-216-121-00	s	RESISTOR CHIP 1M 1/10W(2012)
R1534	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1535	1-216-068-00	s	RESISTOR,CHIP 6.2K 1/10W(2012)
R1536	1-216-069-11	s	RESISTOR,CHIP 6.8K 1/10W(2012)
R1537	1-216-072-00	s	RESISTOR,CHIP 9.1K 1/10W(2012)
R1538	1-216-078-00	s	RESISTOR,CHIP 16K 1/10W(2012)
R1539	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1540	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1551	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1552	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1553	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1556	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1561	1-216-057-00	s	RESISTOR CHIP 2.2K 1/10W(2012)
R1563	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1564	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1571	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1572	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1573	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1574	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1575	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1576	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1577	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1578	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1579	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1581	1-216-677-11	s	RESISTOR,CHIP 12K 1/10W(2012)
R1582	1-216-071-00	s	RESISTOR,CHIP 8.2K 1/10W(2012)
R1583	1-216-097-00	s	RESISTOR CHIP 100K 1/10W(2012)
R1585	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1586	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1587	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1588	1-216-033-00	s	RESISTOR,CHIP 220 1/10W(2012)
R1593	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1594	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1596	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)
R1597	1-216-073-00	s	RESISTOR,CHIP 10K 1/10W(2012)

VD-2 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-062-A	o	MOUNTED CIRCUIT BOARD, VD-2
C1201	1-102-106-00	s	CAPACITOR,CERAMIC;50V/100PF(B)
C1202	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1203	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1205	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1206	1-163-107-00	s	CAPACITOR,CHIP CERAMIC 39PF/50
C1211	1-162-209-31	s	CAPACITOR,CERAMIC 27PF/50V(SL)
C1212	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1213	1-162-207-31	s	CAPACITOR,CERAMIC 22PF/50V(SL)
C1214	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)
C1219	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1221	1-124-257-00	s	CAPACITOR,ELECT 2.2MF/50V
C1222	1-124-257-00	s	CAPACITOR,ELECT 2.2MF/50V
C1312	1-111-241-11	s	CAPACITOR,ELECT 10MF/16V 105C
C1314	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
IC122	8-759-927-56	s	IC BA7021
L1201	1-410-516-11	s	MICRO INDUCTOR 39UH
L1202	1-410-516-11	s	MICRO INDUCTOR 39UH
L1203	1-410-516-11	s	MICRO INDUCTOR 39UH
L1204	1-410-518-41	s	MICRO INDUCTOR 56UH
L1205	1-410-516-11	s	MICRO INDUCTOR 39UH
L1206	1-410-516-11	s	MICRO INDUCTOR 39UH
Q1201	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1202	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1203	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1211	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1212	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1213	8-729-120-28	s	TRANSISTOR 2SC1623-L5L6
Q1214	8-729-216-22	s	TRANSISTOR 2SA1162-G
Q1269	1-801-806-11	s	TRANSISTOR DTC144EAK
R1201	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R1202	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1203	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1204	1-216-059-00	s	RESISTOR,CHIP 2.7K 1/10W(2012)
R1205	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1206	1-216-037-00	s	RESISTOR,CHIP 330 1/10W(2012)
R1207	1-216-065-00	s	RESISTOR CHIP 4.7K 1/10W(2012)
R1208	1-216-047-00	s	RESISTOR, CHIP 820 1/10W(2012)
R1209	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1211	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1212	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R1213	1-216-053-00	s	RESISTOR CHIP 1.5K 1/10W(2012)
R1214	1-216-061-00	s	RESISTOR CHIP 3.3K 1/10W(2012)
R1215	1-216-043-00	s	RESISTOR, CHIP 560 1/10W(2012)
R1216	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1217	1-216-069-11	s	RESISTOR,CHIP 6.8K 1/10W(2012)
R1218	1-216-047-00	s	RESISTOR, CHIP 820 1/10W(2012)
R1219	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1221	1-216-129-00	s	RESISTOR,CHIP 2.2M 1/10W(2012)
R1222	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)
R1223	1-216-129-00	s	RESISTOR,CHIP 2.2M 1/10W(2012)
R1224	1-216-025-00	s	RESISTOR,CHIP 100 1/10W(2012)
R1225	1-216-049-11	s	RESISTOR, CHIP 1K 1/10W(2012)
R1269	1-216-089-00	s	RESISTOR CHIP 47K 1/10W(2012)

VP-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8324-059-A	o	MOUNTED CIRCUIT BOARD, VP-1
C1801	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1804	1-162-284-31	s	CAPACITOR,CERAMIC 150PF/50V(B)
C1805	1-162-285-31	s	CAPACITOR,CERAMIC 180PF/50V(B)
C1806	1-162-203-31	s	CAPACITOR,CERAMIC 15PF/50V(SL)
C1807	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1808	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1809	1-162-209-31	s	CAPACITOR,CERAMIC 27PF/50V(SL)
C1810	1-162-199-31	s	CAPACITOR,CERAMIC 10PF/50V SL
C1811	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1812	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1813	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1814	1-162-294-31	s	CAPACITOR,CERAMIC 1000PF/50V
C1815	1-162-294-31	s	CAPACITOR,CERAMIC 1000PF/50V
C1816	1-162-294-31	s	CAPACITOR,CERAMIC 1000PF/50V
C1817	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1818	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1820	1-164-060-11	s	CAPACITOR,CERAMIC 39P/50V(SL)
C1831	1-101-880-00	s	CAPACITOR,CERAMIC 47PF/50V
C1832	1-101-884-00	s	CAPACITOR,CERAMIC 56PF/50V(SL)
C1833	1-164-079-11	s	CAPACITOR,CERAMIC 330PF/50V(B)
C1834	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1836	1-162-211-31	s	CAPACITOR,CERAMIC 33PF/50V(SL)
C1837	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1839	1-126-154-11	s	CAPACITOR,ELECT 47MF/6.3V
C1840	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1860	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1861	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1880	1-162-198-31	s	CAPACITOR,CERAMIC 8.2PF/50V
C1881	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1882	1-127-550-11	s	CAPACITOR,ELECT 3.3MF/16V SOLI
C1883	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1884	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1885	1-124-252-00	s	CAPACITOR,ELECT 0.33MF/50V
C1886	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1887	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1888	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1889	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1890	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1891	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1892	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
C1893	1-161-021-11	s	CAPACITOR,CERAMIC 0.047MF 25V
C1894	1-161-021-11	s	CAPACITOR,CERAMIC 0.047MF 25V
C1895	1-161-021-11	s	CAPACITOR,CERAMIC 0.047MF 25V
C1896	1-161-021-11	s	CAPACITOR,CERAMIC 0.047MF 25V
C1897	1-102-129-00	s	CAPACITOR,CERAMIC;50V/0.01MF
CN181	1-251-395-11	s	SOCKET, FFC (7P)
D1881	8-719-078-45	s	DIODE GMA01U-BT
IC181	1-809-673-11	s	IC LA7374
L1803	1-410-519-11	s	MICRO INDUCTOR 68UH
L1804	1-410-335-11	s	MICRO INDUCTOR 150UH
L1805	1-410-512-11	s	MICRO INDUCTOR 18UH
L1831	1-410-511-11	s	MICRO INDUCTOR 15UH
L1832	1-410-511-11	s	MICRO INDUCTOR 15UH
L1833	1-410-525-11	s	MICRO INDUCTOR 220UH
L1834	1-410-517-11	s	MICRO INDUCTOR 47UH
L1835	1-410-506-11	s	MICRO INDUCTOR 5.6UH

(VP-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q1801	1-801-878-11	s	TRANSISTOR 2SC4640S
Q1802	1-801-878-11	s	TRANSISTOR 2SC4640S
Q1803	8-729-030-02	s	TRANSISTOR DTC144ESA
Q1804	1-801-878-11	s	TRANSISTOR 2SC4640S
Q1805	1-801-259-11	s	TRANSISTOR 2SA1782S
Q1806	1-801-878-11	s	TRANSISTOR 2SC4640S
Q1807	8-729-030-02	s	TRANSISTOR DTC144ESA
Q1808	8-729-030-02	s	TRANSISTOR DTC144ESA
Q1809	8-729-030-02	s	TRANSISTOR DTC144ESA
Q1831	1-801-878-11	s	TRANSISTOR 2SC4640S
Q1832	1-801-983-11	s	TRANSISTOR 2SC2840-D
Q1833	8-729-030-02	s	TRANSISTOR DTC144ESA
Q1834	1-801-983-11	s	TRANSISTOR 2SC2840-D
Q1835	1-801-259-11	s	TRANSISTOR 2SA1782S
R1801	1-249-420-11	s	RES,CARBON 1.8K 1/4W SMALL
R1802	1-249-421-11	s	RES,CARBON 2.2K 1/4W SMALL
R1803	1-249-423-11	s	RES,CARBON 3.3K 1/4W SMALL
R1804	1-249-427-11	s	RES,CARBON 6.8K 1/4W (SMALL)
R1805	1-249-426-11	s	RES,CARBON 5.6K 1/4W (SMALL)
R1806	1-249-423-11	s	RES,CARBON 3.3K 1/4W SMALL
R1807	1-249-416-11	s	RES,CARBON 820 1/4W
R1808	1-249-429-11	s	RESISTOR,CARBON(SMALL)10K 1/4W
R1809	1-249-429-11	s	RESISTOR,CARBON(SMALL)10K 1/4W
R1810	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1811	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1812	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1813	1-249-416-11	s	RES,CARBON 820 1/4W
R1814	1-249-414-11	s	RES,CARBON 560 1/4W (SMALL)
R1815	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1816	1-249-422-11	s	RES,CARBON 2.7K 1/4W SMALL
R1817	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1818	1-249-433-11	s	RES,CARBON 22K 1/4W
R1819	1-249-433-11	s	RES,CARBON 22K 1/4W
R1820	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1821	1-249-424-11	s	RES,CARBON 3.9K 1/4W SMALL
R1822	1-249-422-11	s	RES,CARBON 2.7K 1/4W SMALL
R1823	1-249-421-11	s	RES,CARBON 2.2K 1/4W SMALL
R1831	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1832	1-249-416-11	s	RES,CARBON 820 1/4W
R1833	1-249-416-11	s	RES,CARBON 820 1/4W
R1834	1-249-412-11	s	RES,CARBON 390 1/4W (SMALL)
R1835	1-247-828-11	s	RESISTOR,CARBON 750 1/4W
R1836	1-249-419-11	s	RES,CARBON 1.5K 1/4W SMALL
R1837	1-249-415-11	s	RES,CARBON 680 1/4W (SMALL)
R1838	1-249-415-11	s	RES,CARBON 680 1/4W (SMALL)
R1840	1-249-420-11	s	RES,CARBON 1.8K 1/4W SMALL
R1841	1-249-420-11	s	RES,CARBON 1.8K 1/4W SMALL
R1842	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1843	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1881	1-249-430-11	s	RES,CARBON 12K 1/4W
R1882	1-249-426-11	s	RES,CARBON 5.6K 1/4W (SMALL)
R1883	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1884	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1885	1-249-417-11	s	RESISTOR,CARBON 1K 1/4W(SMALL)
R1886	1-249-427-11	s	RES,CARBON 6.8K 1/4W (SMALL)
R1887	1-249-427-11	s	RES,CARBON 6.8K 1/4W (SMALL)
R1888	1-249-435-11	s	RESISTOR CARBON 33K 1/4W
R1889	1-249-435-11	s	RESISTOR CARBON 33K 1/4W
R1890	1-249-421-11	s	RES,CARBON 2.2K 1/4W SMALL
R1891	1-249-421-11	s	RES,CARBON 2.2K 1/4W SMALL
R1892	1-249-433-11	s	RES,CARBON 22K 1/4W
VR182	1-228-991-00	s	RESISTOR,ADJ 2.2K

FRAME

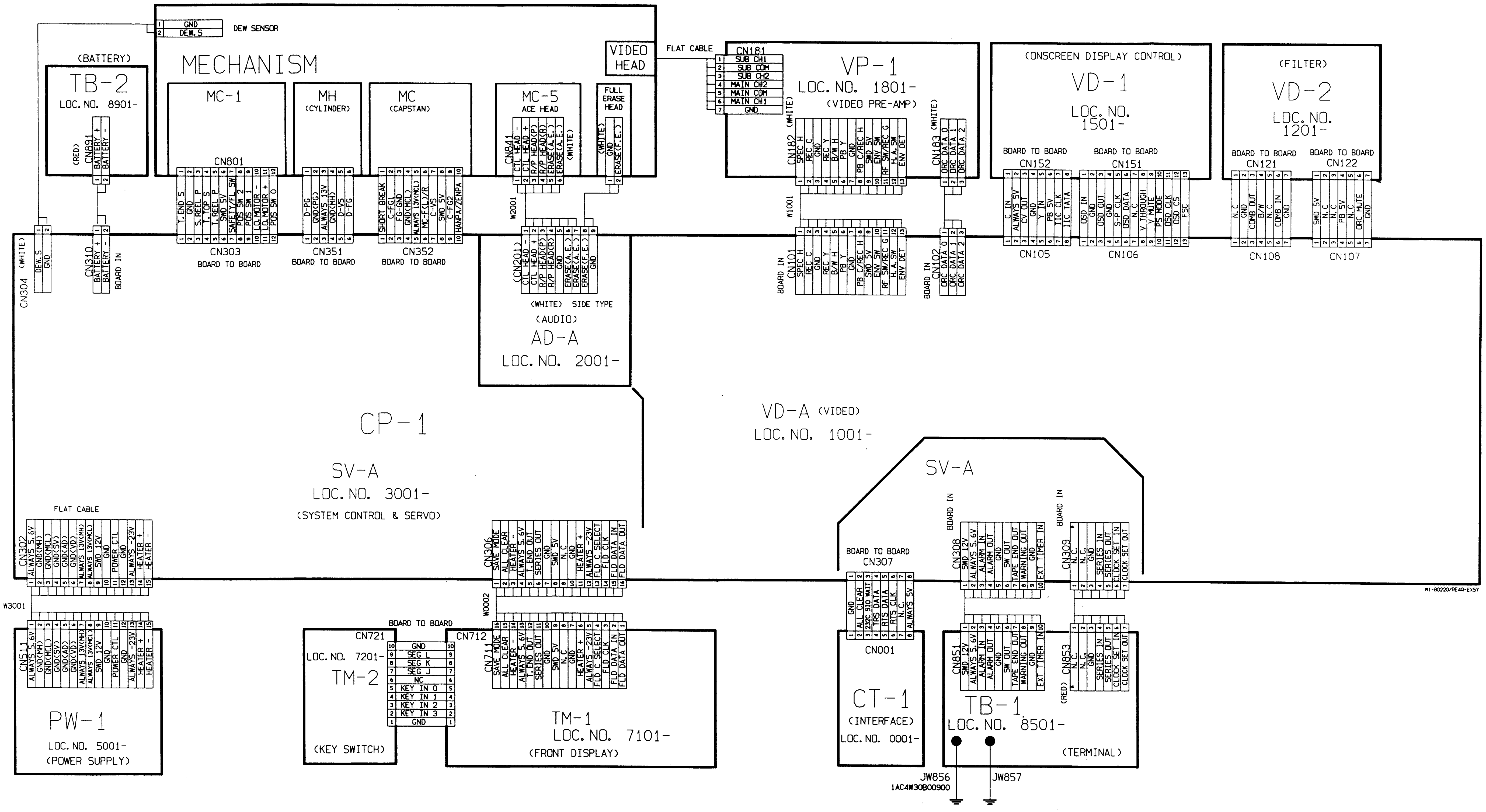
Ref. No. or Q'ty	Part No.	SP	Description
1pc	1-771-864-11	s	SWITCH, JG MODE
1pc	1-801-326-11	s	PHOTO COUPLER SG-105F
1pc	1-810-690-11	s	LED LN59L
1pc	1-810-691-11	s	PHOTO DIODE PN263L-NC

PACKING MATERIALS & SUPPLIED ACCESSORIES

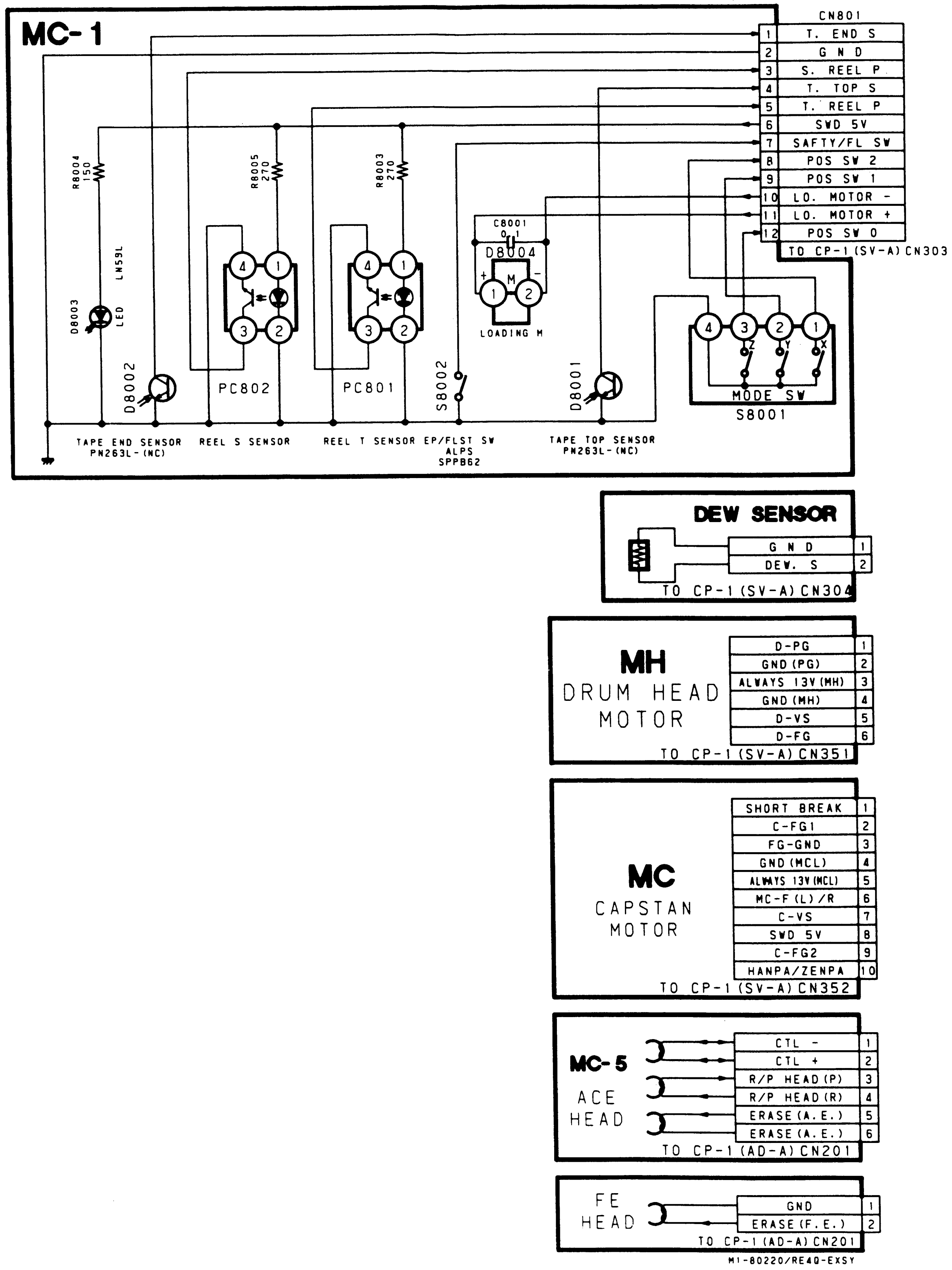
Ref. No. or Q'ty	Part No.	SP	Description
1pc	⚠ 1-534-827-14	s	CORD,POWER (3P)(UL/CSA)
1pc	3-203-312-01	o	MANUAL, INSTRUCTION

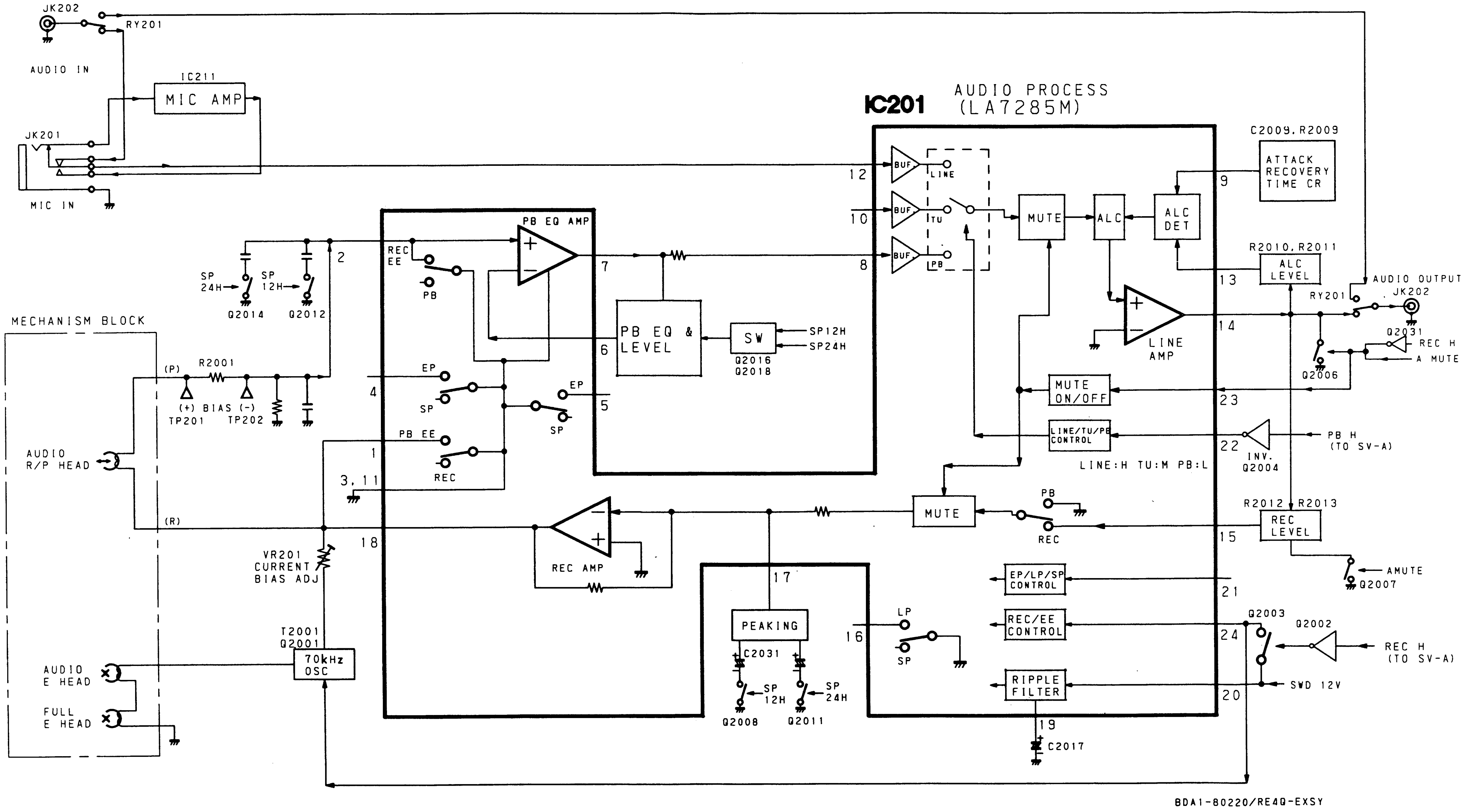
Section 6
Block Diagrams, Schematic Diagrams & Board Layouts

OVERALL WIRING

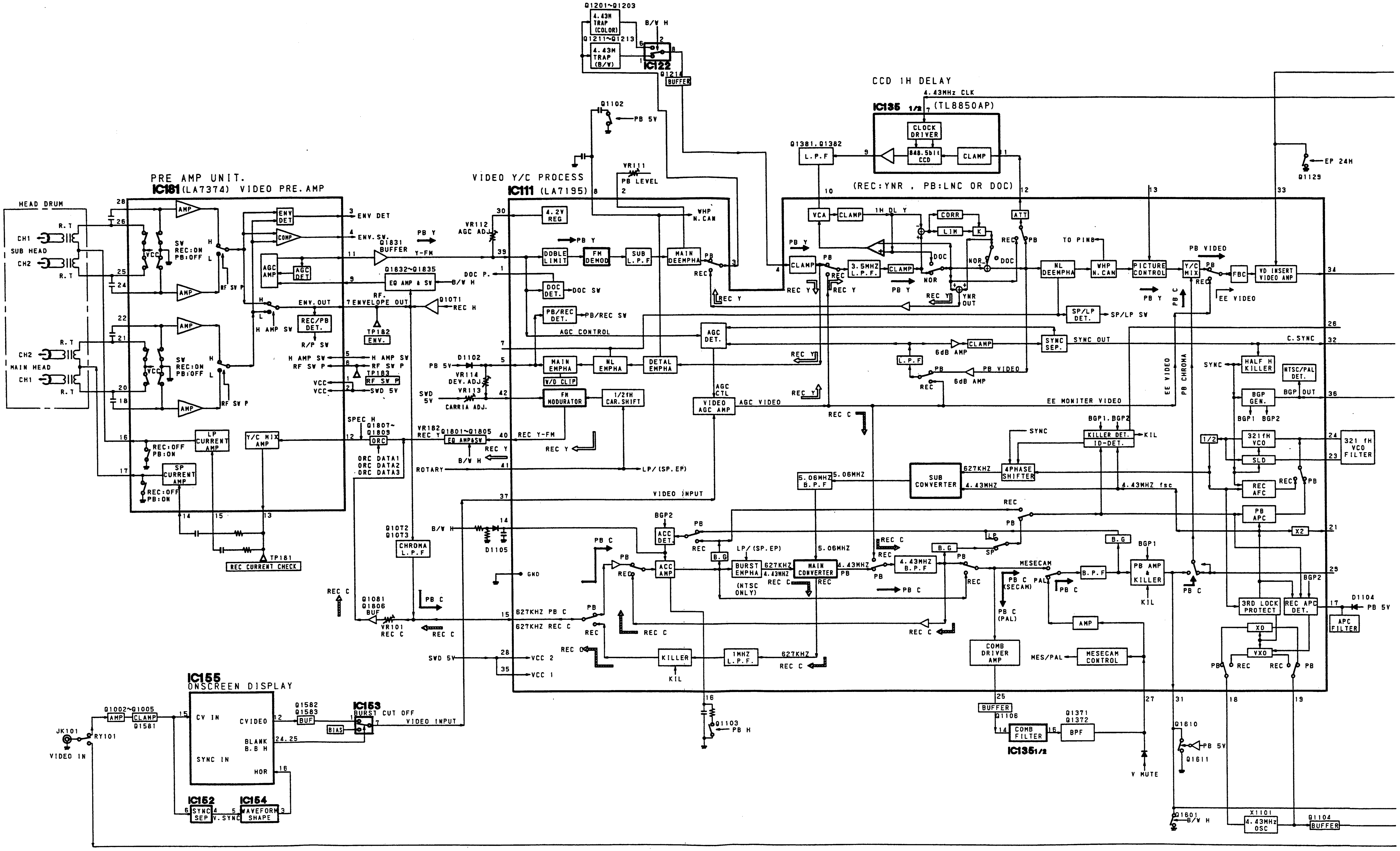

MECHANISM
DEW SENSOR
GND
DEW.S
VIDEO HEAD
FLAT CABLE
(BATTERY)
TB-2
LOC. NO. 8901-
CN891 (RED)
BATTERY +
BATTERY -
MC-1
CN801
MH (CYLINDER)
MC (CAPSTAN)
MC-5 ACE HEAD
CN841
FULL ERASE HEAD
(WHITE)
CN181
SUB CH1
SUB COM
SUB CH2
MAIN CH2
MAIN COM
MAIN CH1
GND
VP-1
LOC. NO. 1801-
(VIDEO PRE-AMP)
CN182 (WHITE)
CN183 (WHITE)
(ONSCREEN DISPLAY CONTROL)
VD-1
LOC. NO. 1501-
BOARD TO BOARD
CN152
CN151
(FILTER)
VD-2
LOC. NO. 1201-
CN121
CN122
CN304 (WHITE)
CN310
BOARD IN
CN303
CN351
CN352
W2001
(CN201) (WHITE) SIDE TYPE
(AUDIO)
AD-A
LOC. NO. 2001-
W1001
CN101
CN102
CN105
CN106
CN108
CN107
CP-1
SV-A
LOC. NO. 3001-
(SYSTEM CONTROL & SERVO)
VD-A (VIDEO)
LOC. NO. 1001-
SV-A
FLAT CABLE
CN302
CN306
W0002
CN307
CN308
CN309
W3001
CN511
PW-1
LOC. NO. 5001-
(POWER SUPPLY)
CN721
CN712
LOC. NO. 7201-
TM-2
(KEY SWITCH)
CN711
TM-1
LOC. NO. 7101-
(FRONT DISPLAY)
CN001
CT-1
(INTERFACE)
LOC. NO. 0001-
CN851
CN853 (RED)
TB-1
LOC. NO. 8501-
(TERMINAL)
JW856
JW857
1AC4W30B00900
W1-B0220/RE40-EXSY

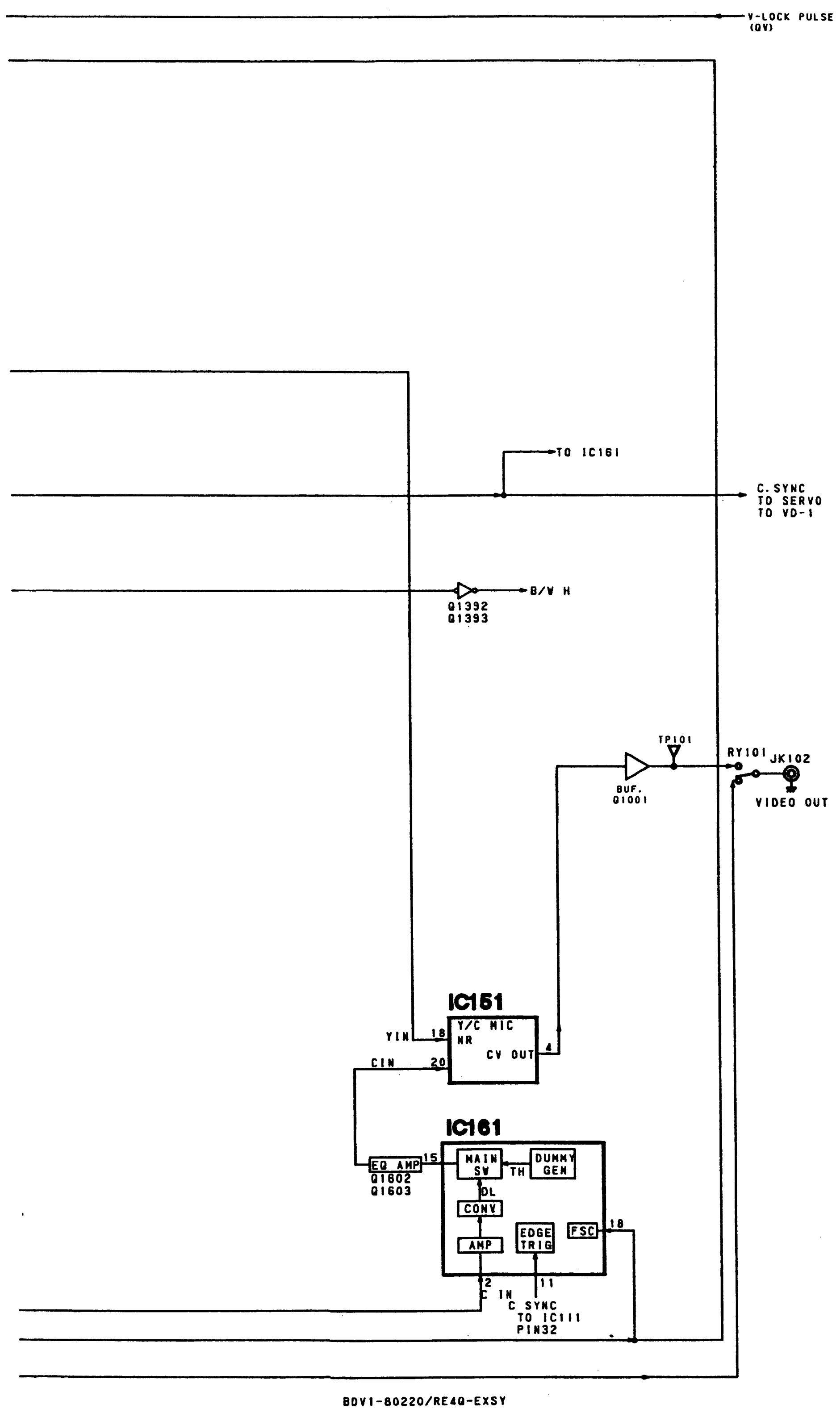
MECHANISM CONNECTION


MC-1
CN801
1 T. END S
2 G N D
3 S. REEL P
4 T. TOP S
5 T. REEL P
6 SWD 5V
7 SAFTY/FL SW
8 POS SW 2
9 POS SW 1
10 LO. MOTOR -
11 LO. MOTOR +
12 POS SW 0
TO CP-1 (SV-A) CN303
R8004 150
R8005 270
R8003 270
C8001 0.1
D8004
M
LOADING M
D8003 LED LN59L
D8002
PC802
PC801
S8002
D8001
MODE SW
S8001
X
Y
Z
TAPE END SENSOR PN263L-(NC)
REEL S SENSOR
REEL T SENSOR
EP/FLST SW ALPS SPPB62
TAPE TOP SENSOR PN263L-(NC)
DEW SENSOR
G N D 1
DEW. S 2
TO CP-1 (SV-A) CN304
MH
DRUM HEAD MOTOR
D-PG 1
GND (PG) 2
ALWAYS 13V (MH) 3
GND (MH) 4
D-VS 5
D-FG 6
TO CP-1 (SV-A) CN351
MC
CAPSTAN MOTOR
SHORT BREAK 1
C-FG1 2
FG-GND 3
GND (MCL) 4
ALWAYS 13V (MCL) 5
MC-F (L)/R 6
C-VS 7
SWD 5V 8
C-FG2 9
HANPA/ZENPA 10
TO CP-1 (SV-A) CN352
MC-5
ACE HEAD
CTL - 1
CTL + 2
R/P HEAD (P) 3
R/P HEAD (R) 4
ERASE (A.E.) 5
ERASE (A.E.) 6
TO CP-1 (AD-A) CN201
FE HEAD
GND 1
ERASE (F.E.) 2
TO CP-1 (AD-A) CN201
MI-80220/RE4Q-EXSY


JK202
RY201
AUDIO IN
IC211
MIC AMP
JK201
MIC IN
IC201
AUDIO PROCESS
(LA7285M)
BUF
LINE
TU
PB
12
10
8
MUTE
ALC
ALC DET
C2009, R2009
ATTACK RECOVERY TIME CR
9
R2010, R2011
ALC LEVEL
13
AUDIO OUTPUT
JK202
RY201
LINE AMP
14
Q2031
REC H
A MUTE
Q2006
MUTE ON/OFF
23
LINE/TU/PB CONTROL
22
INV.
Q2004
PB H
(TO SV-A)
LINE:H TU:M PB:L
R2012
R2013
REC LEVEL
15
AMUTE
Q2007
PB
REC
MUTE
EP/LP/SP CONTROL
21
REC/EE CONTROL
24
Q2003
Q2002
REC H
(TO SV-A)
RIPPLE FILTER
20
SWD 12V
19
C2017
PB EQ AMP
REC
EE
PB
7
2
SP 24H
SP 12H
Q2014
Q2012
PB EQ & LEVEL
6
SW
SP12H
SP24H
Q2016
Q2018
MECHANISM BLOCK
(P)
R2001
(+) BIAS (-)
TP201
TP202
EP
SP
4
EP
5
SP
PB EE
1
REC
3, 11
AUDIO R/P HEAD
(R)
18
REC AMP
VR201
CURRENT BIAS ADJ
17
PEAKING
C2031
SP 12H
SP 24H
Q2008
Q2011
16
LP
SP
T2001
Q2001
70kHz OSC
AUDIO E HEAD
FULL E HEAD
8DA1-80220/RE4Q-EXSY

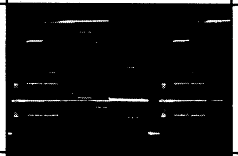
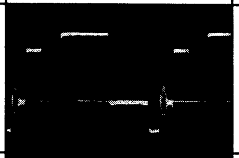
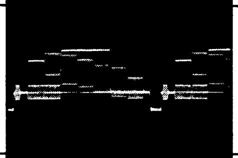
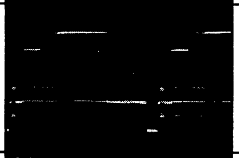
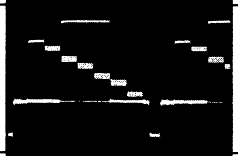
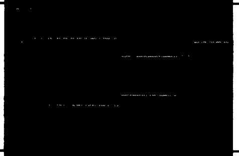
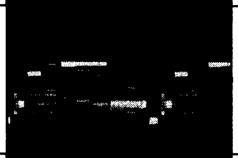
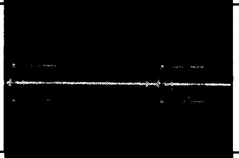
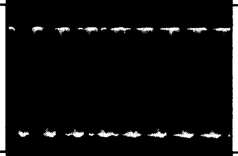
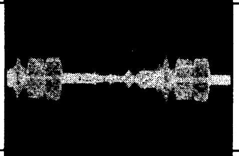
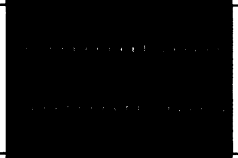
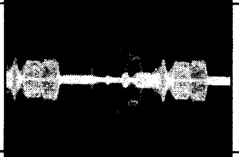
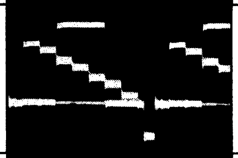
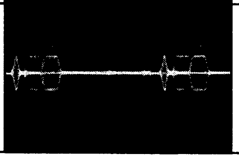
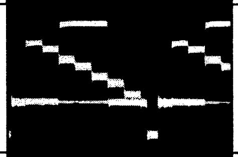
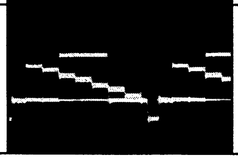
VIDEO CIRCUIT


Q1201~Q1203
4.43M TRAP (COLOR)
Q1211~Q1213
4.43M TRAP (B/W)
B/W H
IC122
Q1214 BUFFER
Q1102
PB 5V
VR111 PB LEVEL
CCD 1H DELAY
4.43MHz CLK
IC135 1/2 (TL8850AP)
CLOCK DRIVER
848.5bit CCD
CLAMP
Q1381.Q1382
L.P.F
(REC:YNR , PB:LNC OR DOC)
EP 24H
Q1129
PRE AMP UNIT.
IC181 (LA7374) VIDEO PRE.AMP
HEAD DRUM
CH1
SUB HEAD
CH2
MAIN HEAD
R.T
AMP
ENV DET
COMP
AGC AMP
AGC DET
SW REC:ON PB:OFF
VCC
RF SW P
ENV.OUT
REC/PB DET.
R/P SW
H AMP SW
LP CURRENT AMP
SP CURRENT AMP
Y/C MIX AMP
REC:OFF PB:ON
TP181
REC CURRENT CHECK
ENV DET
ENV.SW.
Q1831 BUFFER
Y-FM
PB Y
Q1832~Q1835
EQ AMP & SW
B/W H
RF. ENVELOPE OUT
Q1071
REC H
TP182 ENV.
TP183
RF SW P
SWD 5V
SPEC H
Q1807~Q1809
ORC
ORC DATA1
ORC DATA2
ORC DATA3
VR182
REC Y
Q1801~Q1805
EQ AMP&SW
ROTARY
Q1072 Q1073
CHROMA L.P.F
D1105
Q1081 Q1806 BUF
VR101 REC C
VR112 AGC ADJ.
D1102
PB 5V
VR114 DEV.ADJ
VR113 CARRIA ADJ.
SWD 5V
VIDEO Y/C PROCESS
IC111 (LA7195)
4.2V REG
DOBLE LIMIT
FM DEMOD
SUB L.P.F
MAIN DEEMPHA
WHP N.CAN
DOC P.
DOC DET.
DOC SW
PB/REC DET.
PB/REC SW
AGC CONTROL
AGC DET.
MAIN EMPHA
NL EMPHA
DETAL EMPHA
W/D CLIP
FM MODURATOR
1/2fH CAR.SHIFT
LP/(SP.EP)
VIDEO AGC AMP
AGC CTL
AGC VIDEO
REC Y-FM
VIDEO INPUT
ACC DET.
ACC AMP
BGP2
B.G
BURST EMPHA
4.43MHZ
(NTSC ONLY)
MAIN CONVERTER
627KHZ
5.06MHZ
5.06MHZ B.P.F
SUB CONVERTER
4PHASE SHIFTER
KILLER
1MHZ L.P.F.
KIL
627KHZ PB C
627KHZ REC C
VCC 2
VCC 1
GND
VCA
CLAMP
1H DL Y
CORR
LIM
K
3.5MHZ L.P.F.
NOR
DOC
YNR OUT
ATT
TO PIN8
NL DEEMPHA
WHP N.CAN
PICTURE CONTROL
Y/C MIX
FBC
VD INSERT VIDEO AMP
PB VIDEO
EE VIDEO
SP/LP DET.
SP/LP SW
SYNC SEP.
SYNC OUT
C.SYNC
6dB AMP
EE MONITER VIDEO
EE VIDEO
PB CHROMA
HALF H KILLER
NTSC/PAL DET.
BGP GEN.
BGP OUT
BGP1 BGP2
KILLER DET. ID-DET.
SYNC
1/2
321fH VCO
SLD
321 fH VCO FILTER
4.43MHZ fsc
REC AFC
PB APC
X2
4.43MHZ B.P.F
MESECAM
B.P.F
PB AMP & KILLER
PB C (SECAM)
PB C (PAL)
AMP
3RD LOCK PROTECT
REC APC DET.
APC FILTER
D1104
PB 5V
XO
VXO
COMB DRIVER AMP
MES/PAL
MESECAM CONTROL
BUFFER
Q1106
COMB FILTER
IC135 1/2
Q1371 Q1372
BPF
V MUTE
Q1610
Q1611
PB 5V
Q1601
B/W H
X1101 4.43MHz OSC
Q1104 BUFFER
Q1103
PB H
IC155 ONSCREEN DISPLAY
CV IN
CVIDEO
BLANK B.B H
SYNC IN
HOR
Q1002~Q1005
AMP
CLAMP
Q1581
JK101
RY101
VIDEO IN
Q1582 Q1583
BUF
IC153 BURST CUT OFF
BIAS
VIDEO INPUT
IC152 SYNC SEP
V.SYNC
IC154 WAVEFORM SHAPE

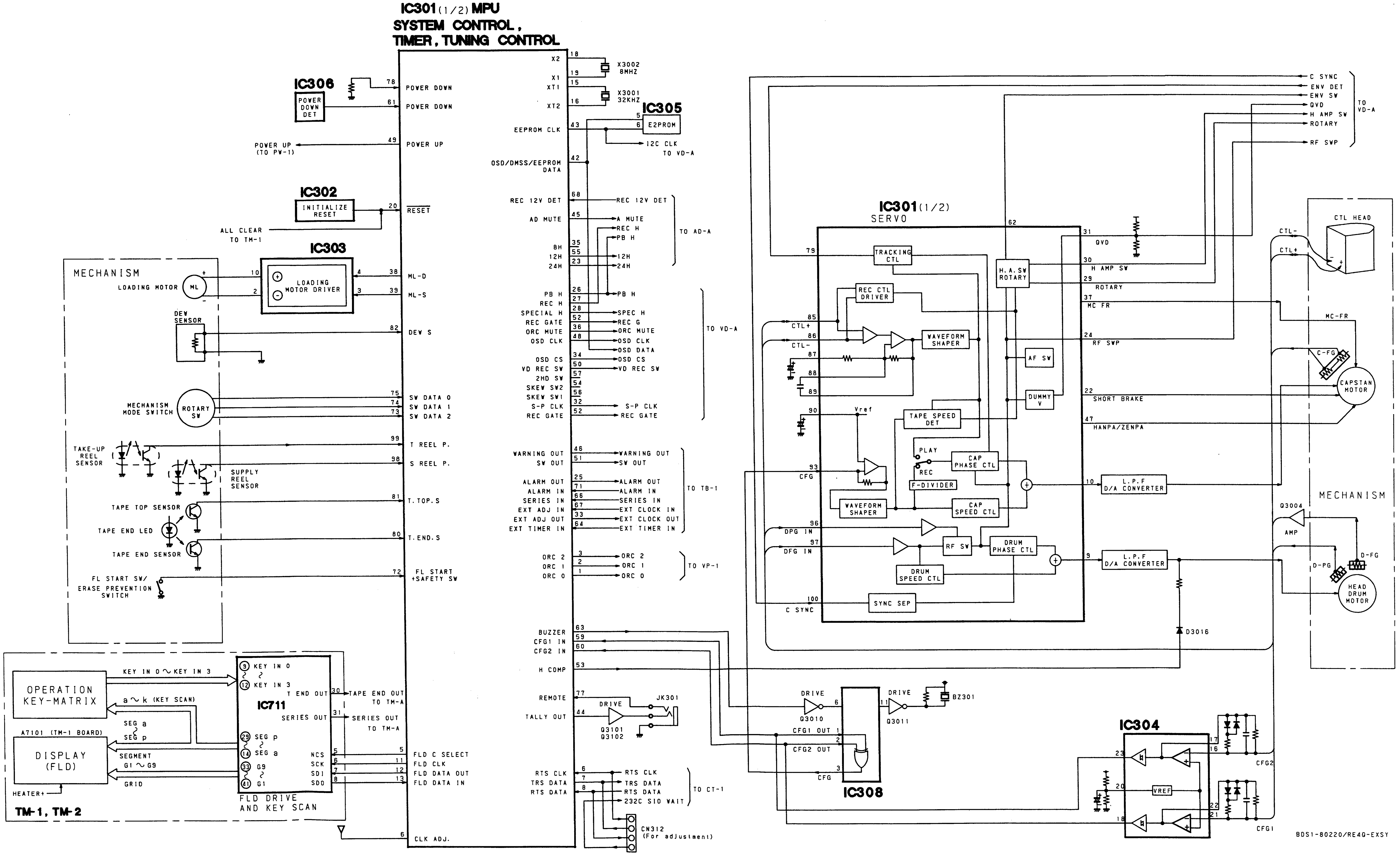

V-LOCK PULSE
(QV)
TO IC161
C.SYNC
TO SERVO
TO VD-1
B/W H
Q1392
Q1393
TP101
BUF.
Q1001
RY101
JK102
VIDEO OUT
IC151
Y/C MIC
NR
CV OUT
YIN
18
CIN
20
4
IC161
EQ AMP
Q1602
Q1603
15
MAIN
SW
TH
DUMMY
GEN
DL
CONV
AMP
EDGE
TRIG
FSC
18
2
C IN
11
C SYNC
TO IC111
PIN32
BDV1-80220/RE4Q-EXSY

VIDEO CIRCUIT WAVEFORMS

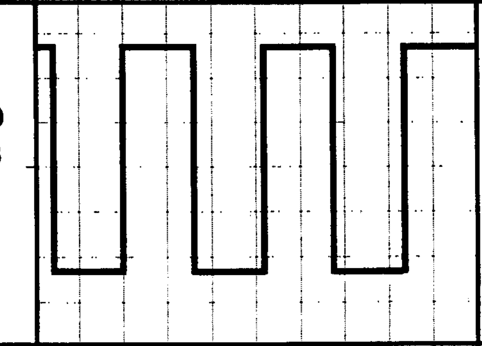
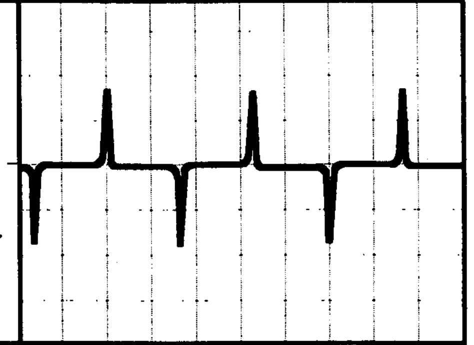
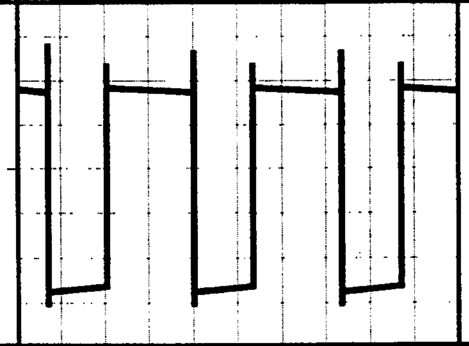
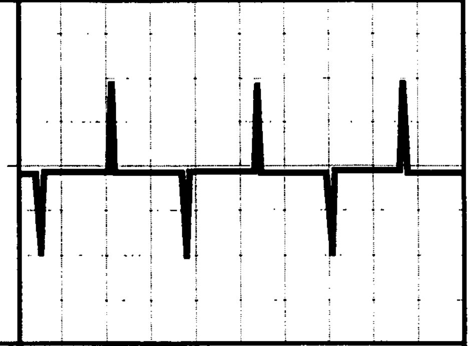
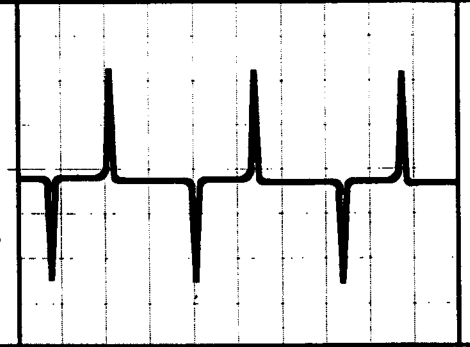
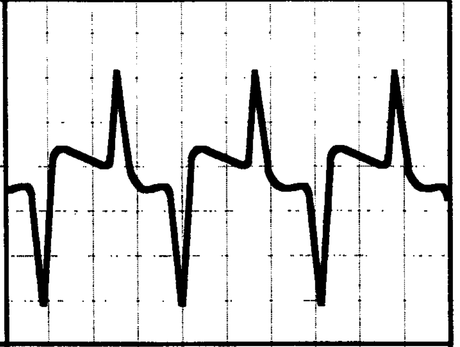
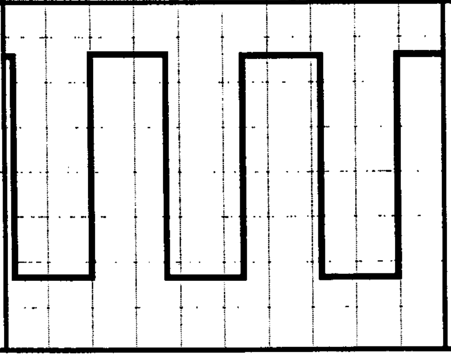
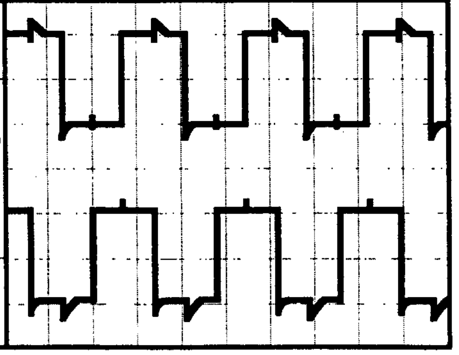
WF-V-EA

TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC111 Pin 37		REC, EE 1 Vp-p	IC111 Pin 34		PB 2 Vp-p
IC111 Pin 3		REC, EE 0.6 Vp-p	IC111 Pin 34		REC, EE 2 Vp-p
IC111 Pin 4		REC, EE 0.5 Vp-p	IC111 (UPPER) Pin 34 (LOWER) Pin 33		STILL (UPPER) 2 Vp-p (LOWER) 5 Vp-p
IC111 Pin 5		REC, EE 1.2 Vp-p	IC111 Pin 15		REC, EE 0.7 Vp-p
IC111 Pin 40		REC, EE 1.0 Vp-p	IC111 Pin 15		PB 0.25 Vp-p
IC111 Pin 39		PB 0.3 Vp-p	IC111 Pin 25		PB 1.0 Vp-p
IC111 Pin 3		PB 0.5 Vp-p	IC111 Pin 31		PB 0.6 Vp-p
IC111 Pin 4		PB 0.5 Vp-p			
IC111 Pins 10/12		PB 0.3 Vp-p			

SYSTEM CONTROL & SERVO CIRCUIT

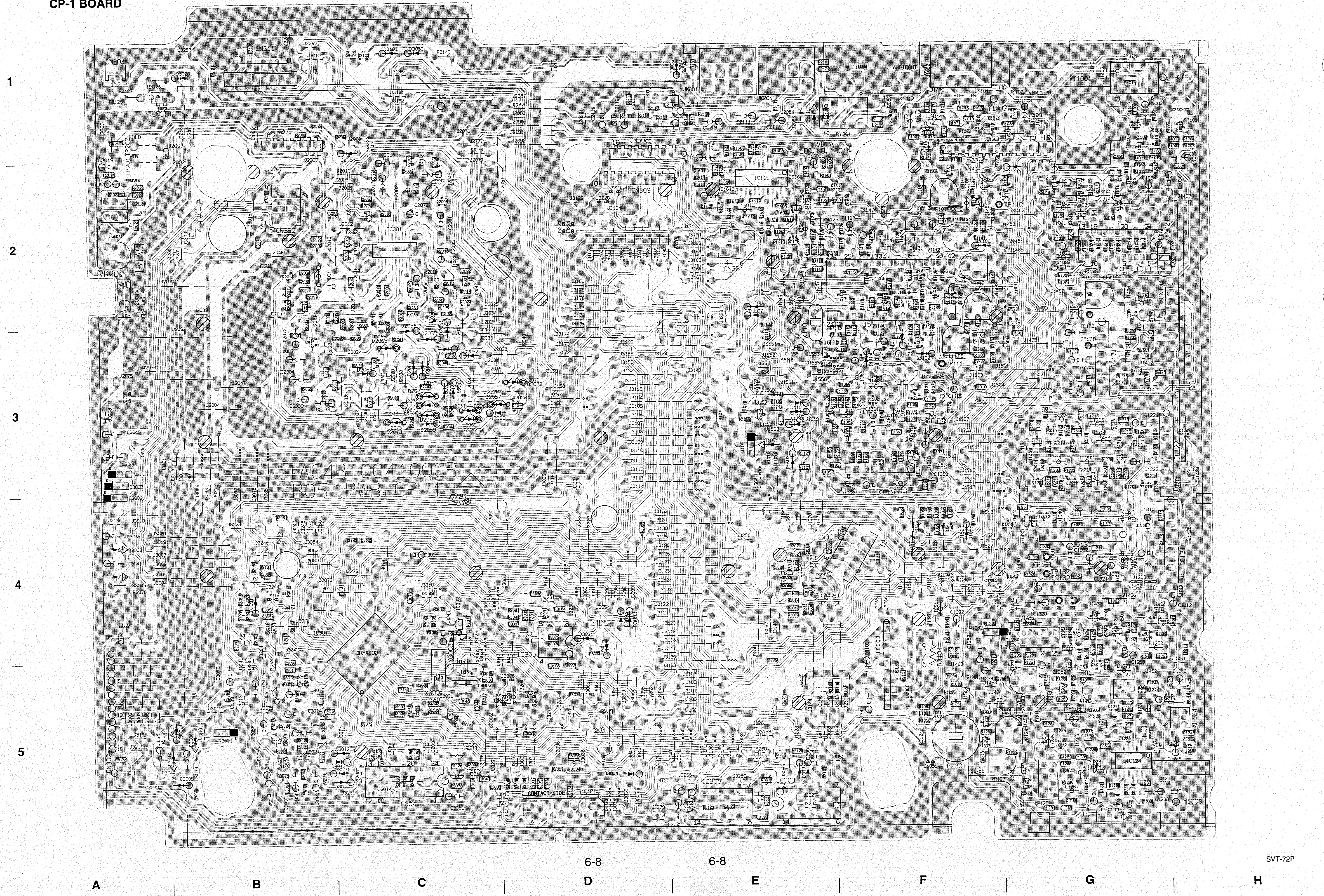

IC301 (1/2) MPU
SYSTEM CONTROL, TIMER, TUNING CONTROL
IC306
POWER DOWN DET
POWER DOWN
POWER UP
POWER UP (TO PW-1)
IC302
INITIALIZE RESET
RESET
ALL CLEAR TO TM-1
IC303
LOADING MOTOR DRIVER
ML-D
ML-S
MECHANISM
LOADING MOTOR
ML
DEW SENSOR
DEW S
MECHANISM MODE SWITCH
ROTARY SW
SW DATA 0
SW DATA 1
SW DATA 2
TAKE-UP REEL SENSOR
SUPPLY REEL SENSOR
T REEL P.
S REEL P.
TAPE TOP SENSOR
TAPE END LED
TAPE END SENSOR
T.TOP.S
T.END.S
FL START SW/ ERASE PREVENTION SWITCH
FL START +SAFETY SW
X2
X1
XT1
XT2
X3002 8MHZ
X3001 32KHZ
IC305
E2PROM
EEPROM CLK
I2C CLK TO VD-A
OSD/DMSS/EEPROM DATA
REC 12V DET
AD MUTE
A MUTE
REC H
PB H
8H
12H
24H
TO AD-A
REC H
SPECIAL H
SPEC H
REC GATE
REC G
ORC MUTE
OSD CLK
OSD DATA
OSD CS
VD REC SW
2HD SW
SKEW SW2
SKEW SW1
S-P CLK
TO VD-A
WARNING OUT
SW OUT
ALARM OUT
ALARM IN
SERIES IN
EXT ADJ IN
EXT ADJ OUT
EXT CLOCK IN
EXT CLOCK OUT
EXT TIMER IN
TO TB-1
ORC 2
ORC 1
ORC 0
TO VP-1
BUZZER
CFG1 IN
CFG2 IN
H COMP
REMOTE
TALLY OUT
DRIVE
Q3101 Q3102
JK301
RTS CLK
TRS DATA
RTS DATA
232C SIO WAIT
TO CT-1
CN312 (For adjustment)
CLK ADJ.
OPERATION KEY-MATRIX
KEY IN 0 ~ KEY IN 3
a ~ k (KEY SCAN)
SEG a ~ SEG p
A7101 (TM-1 BOARD)
DISPLAY (FLD)
SEGMENT G1 ~ G9
GRID
HEATER+
TM-1, TM-2
IC711
KEY IN 0
KEY IN 3
T END OUT
SERIES OUT
TAPE END OUT TO TM-A
SERIES OUT TO TM-A
NCS
SCK
SDI
SDO
FLD C SELECT
FLD CLK
FLD DATA OUT
FLD DATA IN
FLD DRIVE AND KEY SCAN
IC301 (1/2) SERVO
TRACKING CTL
REC CTL DRIVER
WAVEFORM SHAPER
TAPE SPEED DET
CAP PHASE CTL
PLAY
REC
F-DIVIDER
CAP SPEED CTL
RF SW
DRUM PHASE CTL
DRUM SPEED CTL
SYNC SEP
H.A.SW ROTARY
AF SW
DUMMY V
Vref
CTL+
CTL-
CFG
DPG IN
DFG IN
C SYNC
QVD
H AMP SW
ROTARY
MC FR
RF SWP
SHORT BRAKE
HANPA/ZENPA
L.P.F D/A CONVERTER
C SYNC
ENV DET
ENV SW
QVD
H AMP SW
ROTARY
RF SWP
TO VD-A
CTL HEAD
MC-FR
C-FG
CAPSTAN MOTOR
MECHANISM
Q3004
AMP
D-PG
D-FG
HEAD DRUM MOTOR
D3016
DRIVE
Q3010
Q3011
BZ301
CFG1 OUT
CFG2 OUT
IC308
IC304
VREF
CFG2
CFG1
BDS1-80220/RE40-EXSY

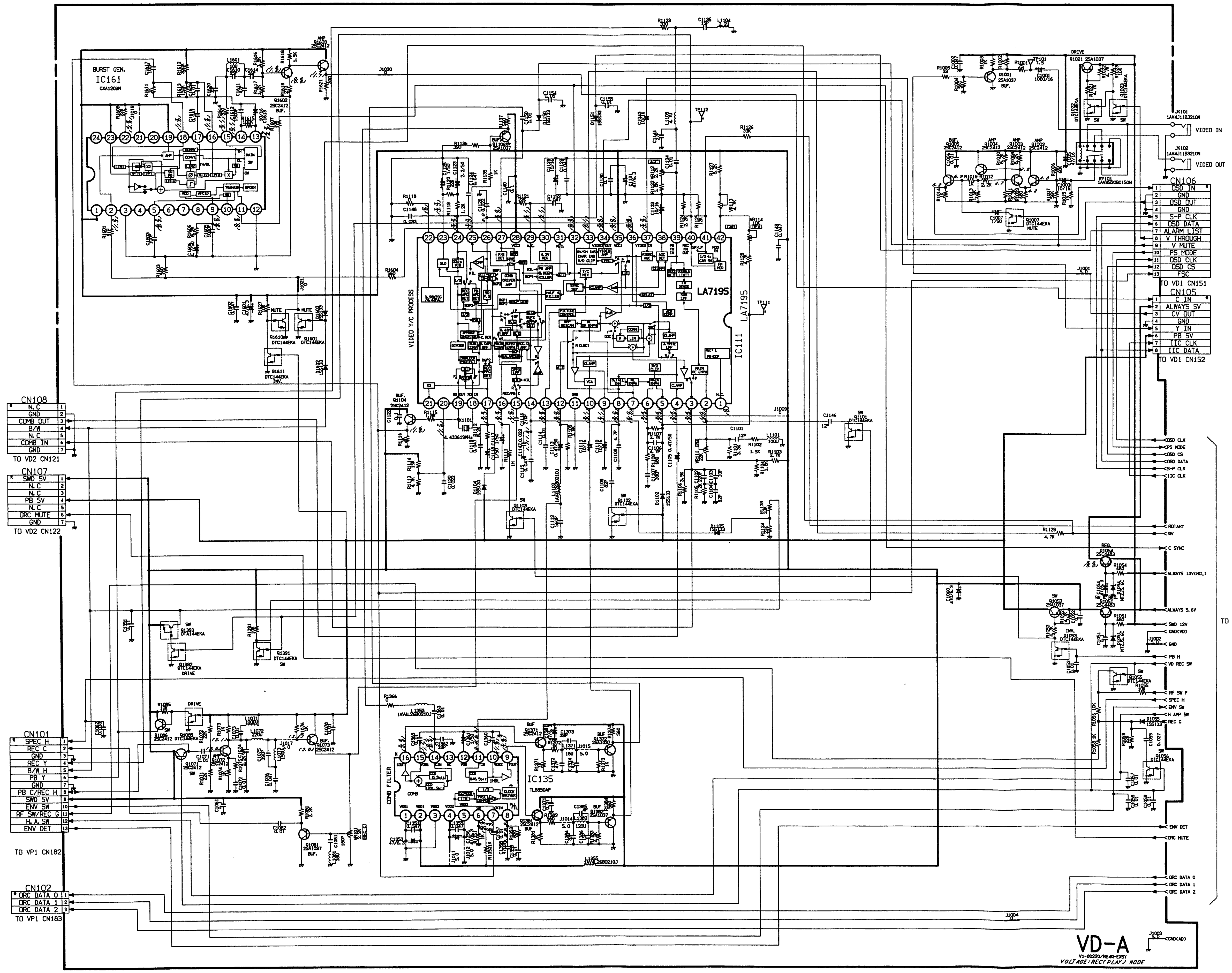
SERVO CIRCUIT WAVEFORMS

TEST LOCATION	WAVEFORM	TEST LOCATION	WAVEFORM
IC301 PIN 9,10 REC/PB 1V/div. 5μs/div.		IC301 PIN 96 REC/PB 100mV/div. 10ms/div.	
IC301 PIN 85 REC 1V/div. 10ms/div.		IC301 PIN 97 REC/PB 50mV/div. 10ms/div.	
IC301 PIN 89 PB 500mV/div. 10ms/div.		IC301 PIN 98, 99 REC/PB 500mV/div. 500ms/div.	
IC301 PIN 93 REC/PB 1V/div. 200μs/div.		IC304 UP: PIN 18 LOW: PIN23 REC/PB 2V/div. 500μs/div.	

WF-S-EC4Q

CP-1 BOARD

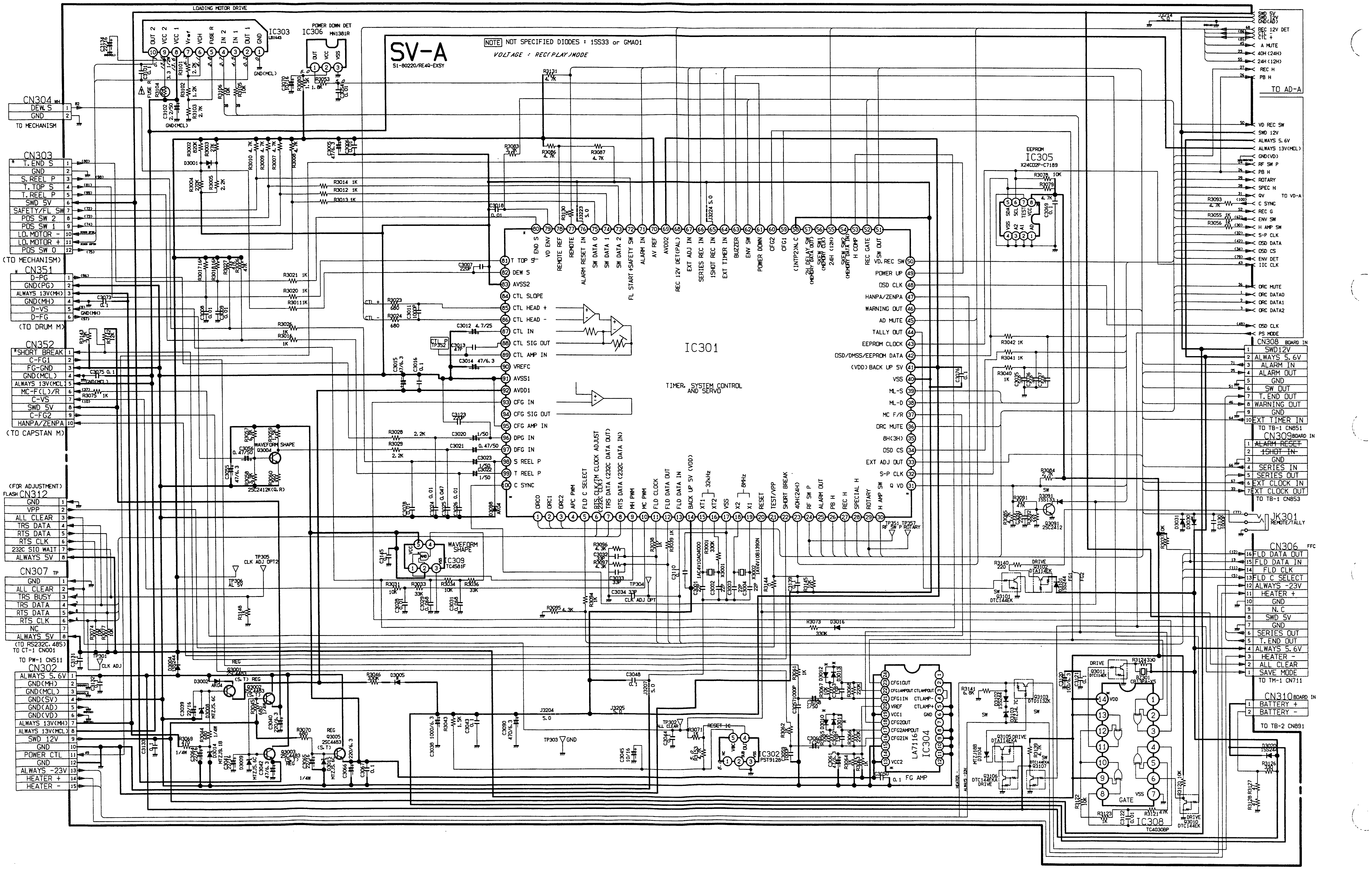

1
2
3
4
5
A
B
C
D
E
F
G
H
1AC4B10C44000B
B05 PWB, CP-1
VD-A
LOC. NO. 1001
AD-A
BIAS
VR201
AUDIO IN
AUDIO OUT
VIDEO IN
VIDEO OUT
FPC CONTACT SIDE
IC201
IC161
IC301
IC305
IC308
IC309
IC324
CN304
CN307
CN308
CN309
CN310
CN311
CN351
CN352
CN303
CN306
CN101
CN103
CN104
JK201
JK202
JK301
BZ301
Y1001
Y1003
X3001
X3002
X3003
VD-1


BURST GEN.
IC161
CXA1203M
VIDEO Y/C PROCESS
IC111
LA7195
COMB FILTER
IC135
TL8850AP
CN108
N.C
GND
COMB OUT
B/W
N.C
COMB IN
GND
TO VD2 CN121
CN107
SWD 5V
N.C
N.C
PB 5V
N.C
DRC MUTE
GND
TO VD2 CN122
CN101
SPEC H
REC C
GND
REC Y
B/W H
PB Y
GND
PB C/REC H
SWD 5V
ENV SW
RF SW/REC G
H.A. SW
ENV DET
TO VP1 CN182
CN102
DRC DATA 0
DRC DATA 1
DRC DATA 2
TO VP1 CN183
JK101
VIDEO IN
JK102
VIDEO OUT
CN106
OSD IN
GND
OSD OUT
GND
S-P CLK
OSD DATA
ALARM LIST
V THROUGH
V MUTE
PS MODE
OSD CLK
OSD CS
FSC
TO VD1 CN151
CN105
C IN
ALWAYS 5V
CV OUT
GND
Y IN
PB 5V
IIC CLK
IIC DATA
TO VD1 CN152
OSD CLK
PS MODE
OSD CS
OSD DATA
S-P CLK
IIC CLK
ROTARY
CV
C SYNC
ALWAYS 13V(MCL)
ALWAYS 5.6V
SWD 12V
GND(VD)
GND
PB H
VD REC SW
RF SW P
SPEC H
ENV SW
H AMP SW
REC G
ENV DET
DRC MUTE
DRC DATA 0
DRC DATA 1
DRC DATA 2
GND(AD)
TO SVA
VD-A
V1-80220/RE40-EXSY
VOLTAGE: REC(PLAY) MODE

1
—
2
—
3
—
4
—
5

A | B | C | D | E | F | G | H

SYSTEM CONTROL & SERVO


SV-A
S1-80220/RE4Q-EXSY
NOTE NOT SPECIFIED DIODES : 1SS33 or GMA01
VOLTAGE : REC(PLAY)MODE
LOADING MOTOR DRIVE
IC303 LB1643
OUT 2
VCC 2
VCC 1
Vref
VCH
FUSE R
IN 2
IN 1
OUT 1
GND
POWER DOWN DET
IC306 MN1381R
OUT
VCC
VSS
GND(MCL)
CN304
DEW S
GND
TO MECHANISM
CN303
T.END S
GND
S.REEL P
T.TOP S
T.REEL P
SWD 5V
SAFETY/FL SW
POS SW 2
POS SW 1
LD.MOTOR -
LD.MOTOR +
POS SW 0
(TO MECHANISM)
CN351
D-PG
GND(PG)
ALWAYS 13V(MH)
GND(MH)
D-VS
D-FG
(TO DRUM M)
CN352
SHORT BREAK
C-FG1
FG-GND
GND(MCL)
ALWAYS 13V(MCL)
MC-F(L)/R
C-VS
SWD 5V
C-FG2
HANPA/ZENPA
(TO CAPSTAN M)
(FOR ADJUSTMENT)
FLASH CN312
GND
VPP
ALL CLEAR
TRS DATA
RTS DATA
RTS CLK
232C SIO WAIT
ALWAYS 5V
CN307 TP
GND
ALL CLEAR
TRS BUSY
TRS DATA
RTS DATA
RTS CLK
NC
ALWAYS 5V
(TO RS232C, 485)
TO CT-1 CN001
TO PW-1 CN511
CN302
ALWAYS 5.6V
GND(MH)
GND(MCL)
GND(SV)
GND(AD)
GND(VD)
ALWAYS 13V(MH)
ALWAYS 13V(MCL)
SWD 12V
GND
POWER CTL
GND
ALWAYS -23V
HEATER +
HEATER -
IC301
TIMER, SYSTEM CONTROL AND SERVO
END S
VD ENV
REMOTE REF
REMOTE
ALARM RESET IN
SW DATA 0
SW DATA 1
SW DATA 2
FL START+SAFETY SW
ALARM IN
AV REF
AVDD2
REC 12V DET(PAL)
EXT ADJ IN
SERIES REC IN
1SHOT REC IN
EXT TIMER IN
BUZZER
ENV SW
POWER DOWN
CFG2
CFG1
(INTP2)N.C
SKEW SW1
SKEW SW0
24H (12H)
H COMP
REC GATE
SW OUT
T TOP S
DEW S
AVSS2
CTL SLOPE
CTL HEAD +
CTL HEAD -
CTL IN
CTL SIG OUT
CTL AMP IN
VREFC
AVSS1
AVDD1
CFG IN
CFG SIG OUT
CFG AMP IN
DPG IN
DFG IN
S REEL P
T REEL P
C SYNC
DRC0
DRC1
DRC2
APC PWM
FLD C SELECT
RTS CLK (232C CLOCK ADJUST)
TRS DATA (232C DATA OUT)
RTS DATA (232C DATA IN)
MH PWM
MC PWM
FLD CLOCK
FLD DATA OUT
FLD DATA IN
BACK UP 5V (VDD)
XT1
XT2
VSS
X2
X1
RESET
TEST/VPP
SHORT BREAK
40H(24H)
ALARM OUT
PB H
REC H
SPECIAL H
ROTARY
H AMP SW
Q VD
VD.REC SW
POWER UP
OSD CLK
HANPA/ZENPA
WARNING OUT
AD MUTE
TALLY OUT
EEPROM CLOCK
OSD/DMSS/EEPROM DATA
(VDD) BACK UP SV
VSS
ML-S
ML-D
MC F/R
DRC MUTE
8H(3H)
OSD CS
EXT ADJ OUT
S-P CLK
32kHz
8MHz
CTL P TP352
WAVEFORM SHAPE
IC309 TC4S81F
TP305 CLK ADJ OPT2
TP306 ALL 5V
TP304
CLK ADJ OPT
TP301 CLK ADJ
TP302 ALL CLEAR
TP303 GND
RESET IC
IC302 PST9128
IC304 LA7116
CFG1OUT
CFG1AMPOUT CTLAMPOUT
CFG1IN CTLAMP-
VREF CTLAMP+
VCC1 GND
CFG2OUT
CFG2AMPOUT
CFG2IN
VCC2
FG AMP
EEPROM
IC305 X24C02P-C7189
REG
Q3001 2SC4483
Q3002 2SC4483
Q3003 2SC4483
Q3005 2SC4483
Q3004 2SC2412K(Q,R)
WAVEFORM SHAPE
IC308 TC4030BP
GATE
DRIVE
SW
TP351 TP357
RF SW P ROTARY
JK301 REMOTE/TALLY
TO AD-A
VD REC SW
SWD 12V
ALWAYS 5.6V
ALWAYS 13V(MCL)
GND(VD)
RF SW P
PB H
ROTARY
SPEC H
QV
C SYNC
REC G
ENV SW
H AMP SW
S-P CLK
OSD DATA
OSD CS
ENV DET
IIC CLK
TO VD-A
DRC MUTE
DRC DATA0
DRC DATA1
DRC DATA2
OSD CLK
PS MODE
SWD 5V
SWD 12V
GND(AD)
DRC 12V DET
CTL +
A MUTE
40H (24H)
24H (12H)
REC H
PB H
CN308 BOARD IN
SWD12V
ALWAYS 5.6V
ALARM IN
ALARM OUT
GND
SW OUT
T.END OUT
WARNING OUT
GND
EXT TIMER IN
TO TB-1 CN851
CN309 BOARD IN
ALARM RESET
1SHOT IN
GND
SERIES IN
SERIES OUT
EXT CLOCK IN
EXT CLOCK OUT
TO TB-1 CN853
CN306 FFC
FLD DATA OUT
FLD DATA IN
FLD CLK
FLD C SELECT
ALWAYS -23V
HEATER +
GND
N.C
SWD 5V
GND
SERIES OUT
T.END OUT
ALWAYS 5.6V
HEATER -
ALL CLEAR
SAVE MODE
TO TM-1 CN711
CN310 BOARD IN
BATTERY +
BATTERY -
TO TB-2 CN891
1
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A
B
C
D
E
F
G
H

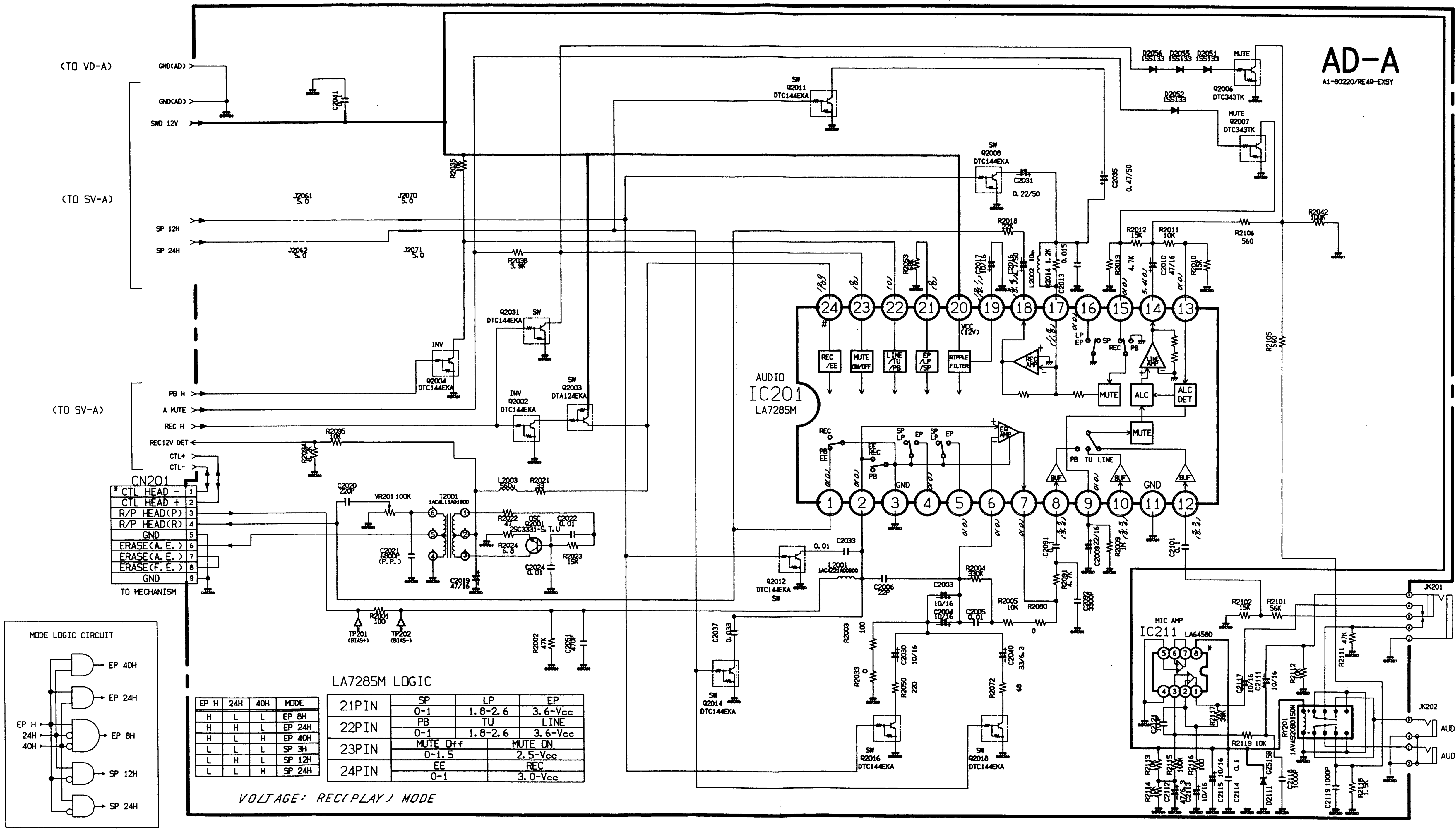
IC301 SYSTEM CONTROL/SERVO MPU PIN FUNCTION TABLE

No.	Name	I/O	H/L	Signal Function
1	ORC0	O	O	Optimum picture control (ORC) data signal.
2	ORC1	O	O	
3	ORC2	O	O	
4	APC PWM	-	-	-
5	FLD C SELECT	O	H	Chip enable signal to FLD control IC.
6	RTS CLK	I	-	Clock signal from controllor CPU.
7	TRS DATA	O	-	Data signal to controllor.
8	RTS DATA	I	-	Data signal from controllor.
9	MH-PWM	O	-	Output of head drum motor servo control signal. (PWM signal)
10	MC-PWM	O	-	Output of capstan motor servo control signal. (PWM signal)
11	FLD CLK	O	-	Clock signal to FLD control IC.
12	FLD DATA OUT	O	-	Data signal to FLD control IC.
13	FLD DATA IN	O	H	High output except when power is off.
14	BACKUP 5V	O	-	5VDC
15	XT1	-	-	Clock osc during power failures and timer. 32.768KHz
16	XT2	-	-	
17	Vss	-	-	Ground terminal.
18	X2	-	-	System clock OSC. 8MHz
19	X1	-	-	
20	RESET	I	L	Initial reset terminal for this IC.
21	TEST/Vpp	-	-	-
22	SHORT BREAK	O	H	Break signal for capstan motor.
23	40H(24H)	O	H	Signal to indicate 40H(24H) mode.
24	RF SW P	O	-	RF switching pulse created by head drum PG.
25	ALARM OUT	O	H	Alarm signal output.
26	PB H	O	H	Signal for indicating playback mode.
27	REC H	O	H	Signal for indicating recording mode.
28	SPECIAL H	O	H	Signal for indicating special play (slow, still, e.t.c) mode.
29	ROTARY	O	-	Video head CH1/CH2 confirmation signal. (Used in the processing of image circuit color signals.)
30	H AMP SW	O	-	Video head CH1/CH2 confirmation signal. (Used in the video head amp.)
31	QVD	O	-	Quasi vertical synchronizing signal.
32	S-P CLK	O	-	Clock for serial/parallel convert IC.
33	EXT ADJ OUT	O	-	Signal output to adjust the current time of the timer clock.
34	OSD CS	O	H	Chip enable signal toon screen display IC.
35	8H(3H)	O	H	Signal to indicate 8H(3H) mode.
36	ORC MUTE	O	H	Signal to disable video signal output during ORC dectation mode.
37	MC F/R	O	-	Capstan motor rotation direction (normal/reverse) indication signal. (Reverse; H)
38	ML-D	O	-	Loading motor rotation direction indication signal. (Load; H, Brake; M, Unload; L)
39	ML-S	O	-	Loading motor speed (high/mid/low) indication signal.
40	VSS	-	-	Ground terminal.
41	BACK UP 5V	-	-	Power supply for this IC.
42	COMMON DATA	O	-	Data I/O to OSD, DMSS(VSC) and EEPROM IC.
43	EEPROM CLK	O	-	Clock to EEPROM IC.
44	TALLY OUT	O	-	Signal to indicate the VCR mode or worning.
45	AD MUTE	O	H	Signal disable audio signal output.
46	WARNING OUT	O	H	Warning signal output.
47	HANPA/ZENPA	O	-	Signal to switch capstan motor speed control. Hanpa= H(high speed) / Zenpa= L(Normal speed)
48	OSD CLK	O	-	Clock for OSD IC.
49	POWER UP	O	H	"H" output except the power is off.
50	VD REC SW	O	H	"H" output during video is recording.

No.	Name	I/O	H/L	Signal Function
51	SW OUT	O	-	Switch signal to flame switcher.
52	REC GATE	O	L	Signal to indicate recording.
53	H COMP	O	-	Signal to adjust the speed of head drum.
54	SKEW SW2	-	-	-
55	24H(12H)	O	H	Signal to indicate 24H(12H) mode.
56	SKEW SW1	-	-	-
57	2H DELAY SW	-	-	-
58	N.C.	-	-	-
59	CFG1	I	-	Capstan FG1 pulse input..
60	CFG2	I	-	Capstan FG2 pulse input..
61	POWER DOWN	I	L	Power failure detection terminal.
62	ENV SW	I	-	Output comparation signal for main head and sub head.
63	BUZZER	O	-	Signal to drive the buzzer.
64	EXT TIMER IN	I	H	Timer recording during H input.
65	1SHOT REC IN	-	-	-
66	SERIES REC IN	I	H	Signal to start series recording.
67	EXT ADJ IN	I	H	Signal input to adjust the current time of the timer clock.
68	REC 12V DET	I	H	Record mode indication signal input.
69	AVdd	-	-	Power supply for analog circuitry.
70	AVREF	-	-	Reference voltage for analog circuitry.
71	ALARM IN	I	H	Alarm recording signal input.
72	FLSTART + SAFETY	I	L	Switch input indicating start of cassette loading or discharge by cassette mechanism and detecting accidental erasure prevention tab of cassette tape.
73	SWDATA 2	I	-	Input of the three-bit signal that indicates mechanism operational position.
74	SWDATA 1	I	-	
75	SWDATA 0	I	-	
76	ALARM RESET IN	-	-	-
77	REMOTE	I	-	Remote control signal(voltage) input.
78	REMOTE REF	-	-	Reference voltage for remote control signal.
79	VD ENV	I	-	Video head envelop detection signal input for ATR function.
80	T END S	I	L	Sensor signal input for tape end detection.
81	T TOP S	I	L	Sensor signal input for tape top detection.
82	DEW S	I	H	Dew sensor input pin.
83	AVss	-	-	Ground for analog circuitry.
84	CTL SLOPE	-	-	-
85	CTL HEAD +	I/O	H	Control pulse I/O.
86	CTL HEAD -	I/O	H	Control pulse I/O.
87	CTL IN	-	-	Control amp feed back filter.
88	CTL SIG OUT	O	-	Control amp out.
89	CTL AMP IN	I	-	Input signal from control amp.
90	Vref	-	-	Reference voltage for servo circuitry.
91	AVss1	-	-	Ground.
92	AVdd1	-	-	IC power source for analog circuitry.
93	CFG IN	I	-	Capstan motor FG pulse input.
94	CFG SIG OUT	-	-	-
95	CFG AMP IN	-	-	-
96	DPG IN	I	-	Head drum PG pulse input. (Used in servo control and generate the switching pulse.)
97	DFG IN	I	-	Head drum FG pulse input. (For drum servo)
98	S REEL P	I	-	Supply reel moving sensor input.
99	T REEL P	I	-	Take up reel moving sensor input.
100	C SYNC	I	-	Composite synchronizing signal input.

RE4QEXSY_IC301

AUDIO


AD-A
A1-80220/RE4Q-EXSY
(TO VD-A)
GND(AD)
GND(AD)
SWD 12V
(TO SV-A)
SP 12H
SP 24H
(TO SV-A)
PB H
A MUTE
REC H
REC12V DET
CTL+
CTL-
CN201
CTL HEAD -
CTL HEAD +
R/P HEAD(P)
R/P HEAD(R)
GND
ERASE(A.E.)
ERASE(A.E.)
ERASE(F.E.)
GND
TO MECHANISM
AUDIO
IC201
LA7285M
REC /EE
MUTE ON/OFF
LINE /TU /PB
EP /LP /SP
RIPPLE FILTER
VCC (12V)
REC AMP
LINE AMP
MUTE
ALC
ALC DET
EQ AMP
BUF
GND
PB TU LINE
Q2011 DTC144EKA
Q2008 DTC144EKA
Q2006 DTC343TK
Q2007 DTC343TK
Q2031 DTC144EKA
Q2004 DTC144EKA
Q2002 DTC144EKA
Q2003 DTA124EKA
Q2001 2SC3331-S.T.U
Q2012 DTC144EKA
Q2014 DTC144EKA
Q2016 DTC144EKA
Q2018 DTC144EKA
T2001
VR201 100K
L2001
L2003
OSC
TP201 (BIAS+)
TP202 (BIAS-)
R2001 100
MIC AMP
IC211 LA6458D
JK201
MIC IN
JK202
AUDIO IN
AUDIO OUT
RY201
D2111
MODE LOGIC CIRCUIT
EP H
24H
40H
EP 40H
EP 24H
EP 8H
SP 12H
SP 24H
1
2
3
4
5
A
B
C
D
E
F
G
H

EP H	24H	40H	MODE
H	L	L	EP 8H
H	H	L	EP 24H
H	L	H	EP 40H
L	L	L	SP 3H
L	H	L	SP 12H
L	L	H	SP 24H

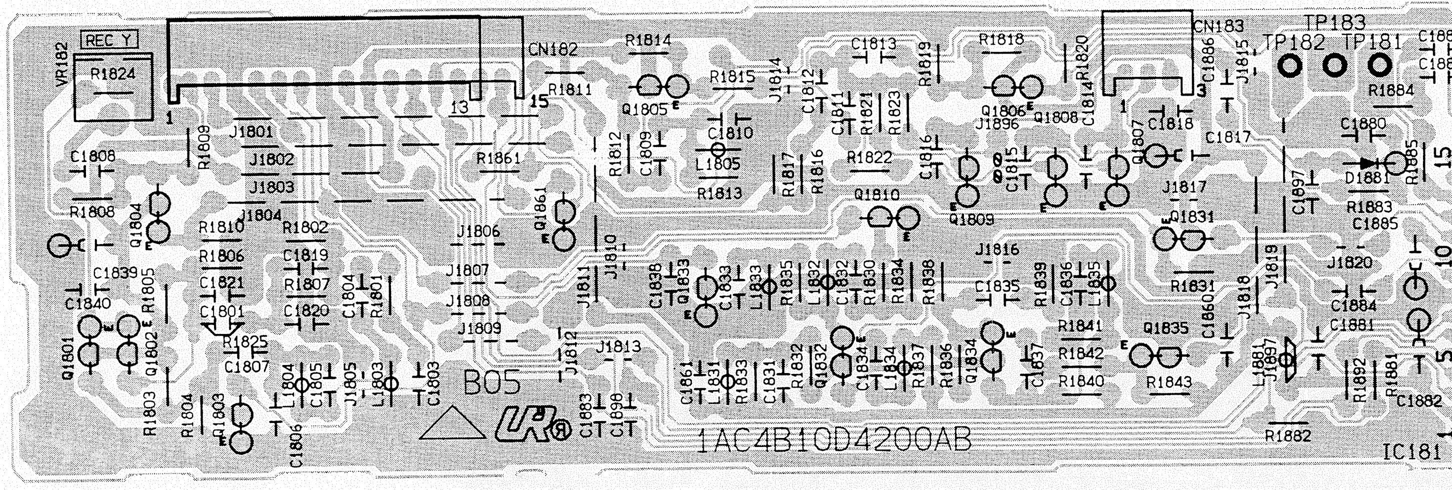
LA7285M LOGIC

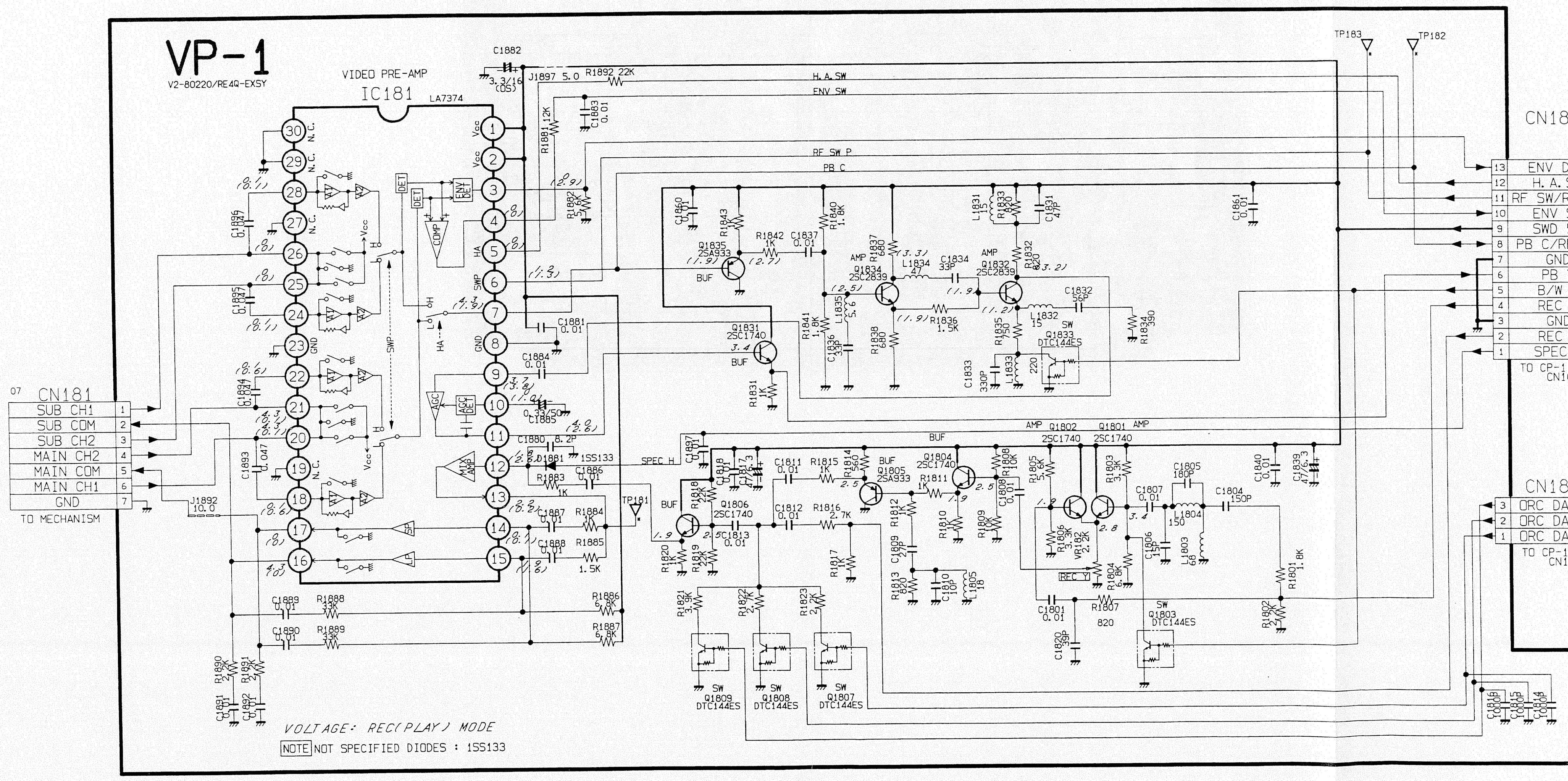
21PIN	SP	LP	EP
	0-1	1.8-2.6	3.6-Vcc
22PIN	PB	TU	LINE
	0-1	1.8-2.6	3.6-Vcc
23PIN	MUTE Off		MUTE ON
	0-1.5		2.5-Vcc
24PIN	EE		REC
	0-1		3.0-Vcc

VOLTAGE: REC(PLAY) MODE

VIDEO PRE-AMP

VP-1 P.W.B.


CN182
CN183
TP183
TP182
TP181
IC181
CN181
B05
1AC4B10D4200AB
PWB. VP-1
LOC. NO. 1801-
REC Y
VR182


VP-1
V2-80220/RE4Q-EXSY
VIDEO PRE-AMP
IC181 LA7374
CN182
13 ENV DET
12 H. A. SW
11 RF SW/REC G
10 ENV SW
9 SWD 5V
8 PB C/REC H
7 GND
6 PB Y
5 B/W H
4 REC Y
3 GND
2 REC C
1 SPEC H
TO CP-1(VD-A) CN101
CN181
1 SUB CH1
2 SUB COM
3 SUB CH2
4 MAIN CH2
5 MAIN COM
6 MAIN CH1
7 GND
TO MECHANISM
CN183
3 ORC DATA 2
2 ORC DATA 1
1 ORC DATA 0
TO CP-1(VD-A) CN102
TP183
TP182
TP181
H. A. SW
ENV SW
RF SW P
PB C
SPEC H
BUF
AMP
SW
Q1835 2SA933
Q1834 2SC2839
Q1832 2SC2839
Q1831 2SC1740
Q1833 DTC144ES
Q1806 2SC1740
Q1805 2SA933
Q1804 2SC1740
Q1802 2SC1740
Q1801 2SC1740
Q1803 DTC144ES
Q1809 DTC144ES
Q1808 DTC144ES
Q1807 DTC144ES
D1881 1SS133
VOLTAGE: REC(PLAY) MODE
NOTE NOT SPECIFIED DIODES : 1SS133

1
2
3
4
5

A B C D E F G H

1

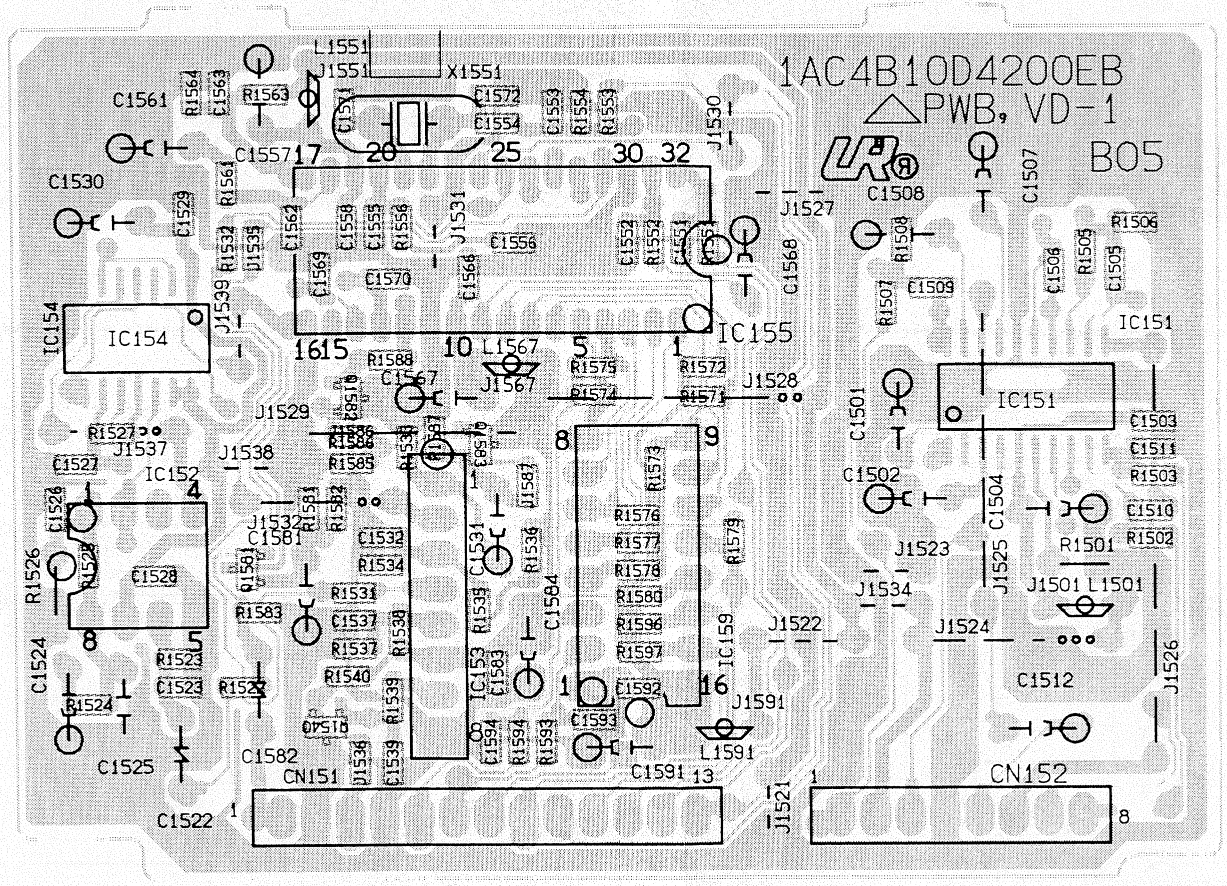
2

3

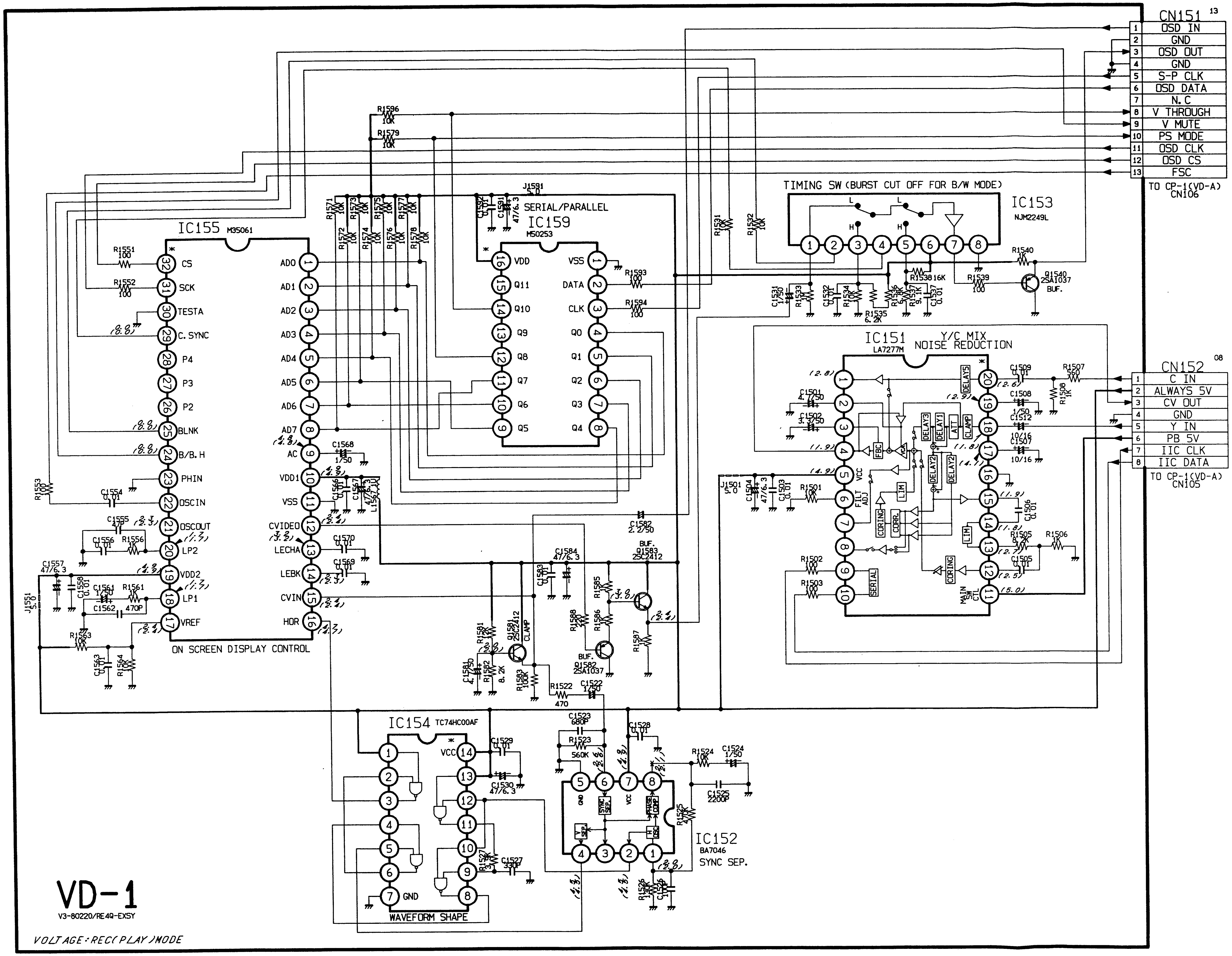
4

5

VD-1 P.W.B.


1AC4B10D4200EB
PWB, VD-1
B05
IC151
IC152
IC153
IC154
IC155
IC159
CN151
CN152
X1551
L1551
L1567
L1591
L1501
C1561
C1530
C1557
C1508
C1507
C1568
C1567
C1501
C1502
C1504
C1512
C1524
C1525
C1522
C1582
C1581
C1531
C1584
C1591
J1551
J1527
J1529
J1537
J1538
J1532
J1567
J1528
J1523
J1534
J1525
J1522
J1524
J1501
J1526
J1591
J1521
J1530
J1531
J1539
R1526
R1501

ON SCREEN DISPLAY CONTROL


CN151
OSD IN
GND
OSD OUT
GND
S-P CLK
OSD DATA
N.C
V THROUGH
V MUTE
PS MODE
OSD CLK
OSD CS
FSC
TO CP-1(VD-A) CN106
TIMING SW (BURST CUT OFF FOR B/W MODE)
IC153
NJM2249L
IC155 M35061
CS
SCK
TESTA
C.SYNC
P4
P3
P2
BLNK
B/B.H
PHIN
OSCIN
OSCOUT
LP2
VDD2
LP1
VREF
AD0
AD1
AD2
AD3
AD4
AD5
AD6
AD7
AC
VDD1
VSS
CVIDEO
LECHA
LEBK
CVIN
HOR
ON SCREEN DISPLAY CONTROL
SERIAL/PARALLEL
IC159
M50253
VDD
Q11
Q10
Q9
Q8
Q7
Q6
Q5
VSS
DATA
CLK
Q0
Q1
Q2
Q3
Q4
Q1540 2SA1037 BUF.
IC151 LA7277M
Y/C MIX NOISE REDUCTION
DELAY3
DELAY1
ATT
CLAMP
DELAY2
LIM
CORING
CORR.
SERIAL
FILT ADJ
VCC
MAIN SW CTL
CN152
C IN
ALWAYS 5V
CV OUT
GND
Y IN
PB 5V
IIC CLK
IIC DATA
TO CP-1(VD-A) CN105
Q1581 2SC2412 CLAMP
Q1582 2SA1037 BUF.
Q1583 2SC2412 BUF.
IC154 TC74HC00AF
VCC
GND
WAVEFORM SHAPE
IC152
BA7046
SYNC SEP.
VD-1
V3-80220/RE4Q-EXSY
VOLTAGE: REC(PLAY)MODE

VD-2 P.W.B.

1

—

2

—

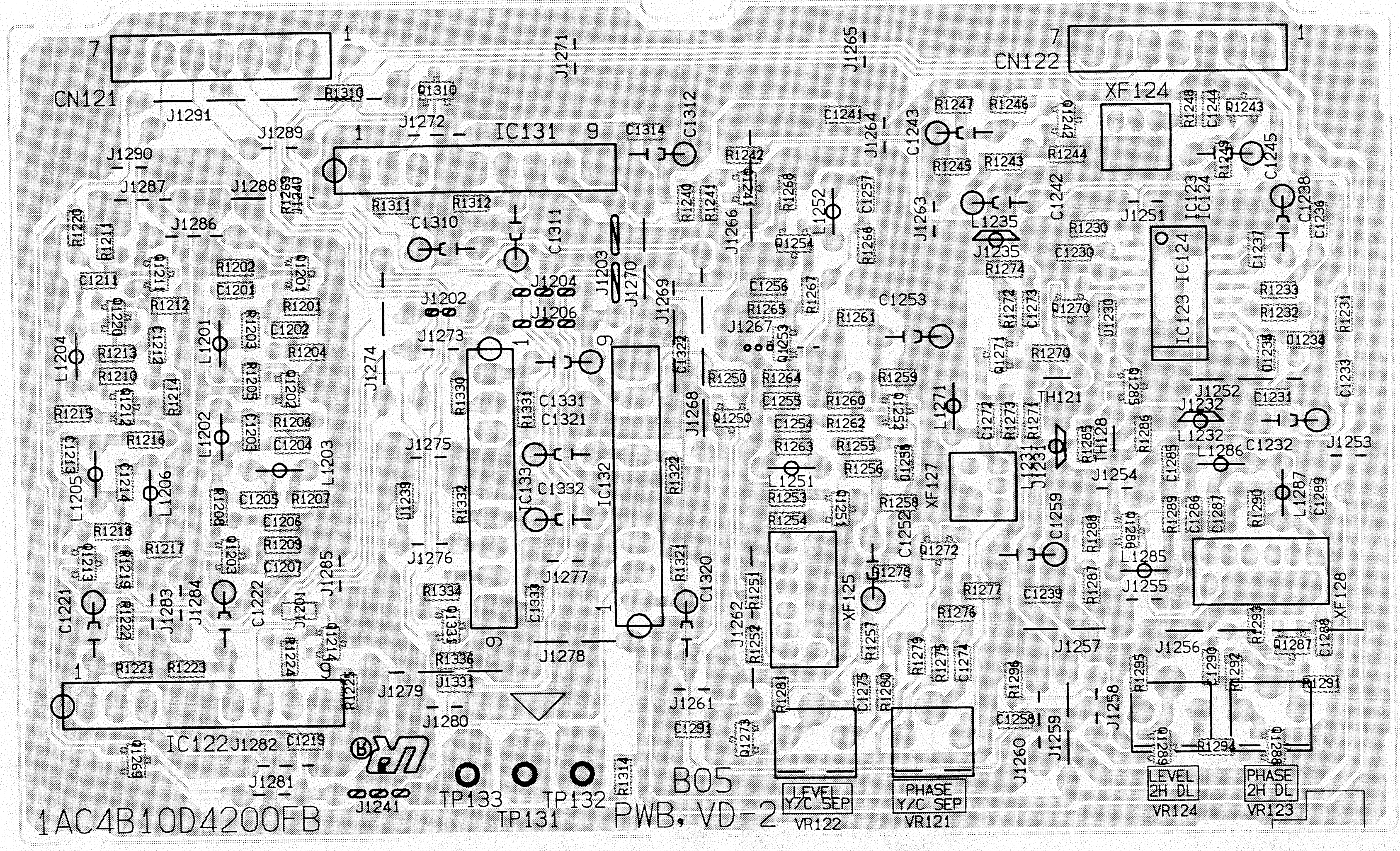
3

—

4

—

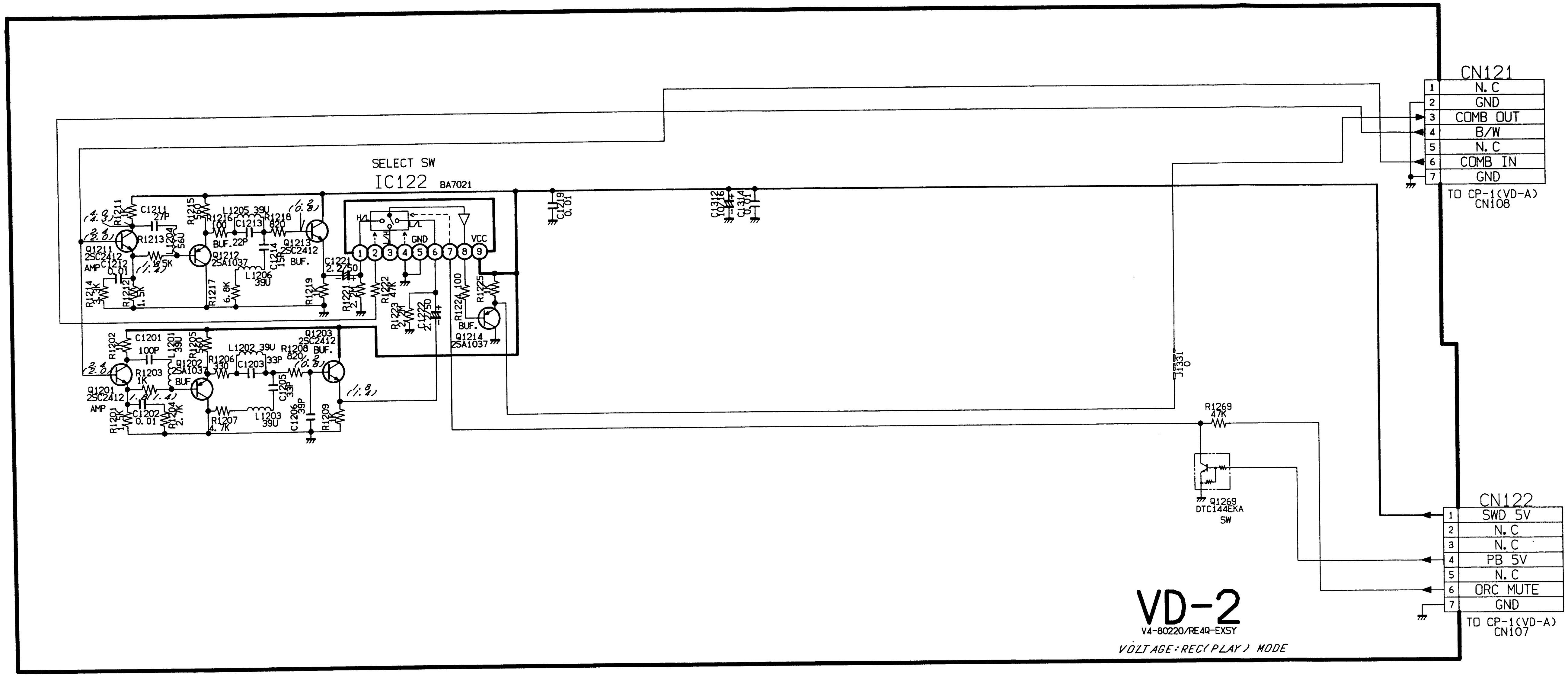
5


CN121
CN122
IC131
IC132
IC133
IC122
IC123 IC124
XF124
XF125
XF127
XF128
TP133
TP131
TP132
B05
1AC4B10D4200FB
PWB, VD-2
LEVEL Y/C SEP
VR122
PHASE Y/C SEP
VR121
LEVEL 2H DL
VR124
PHASE 2H DL
VR123

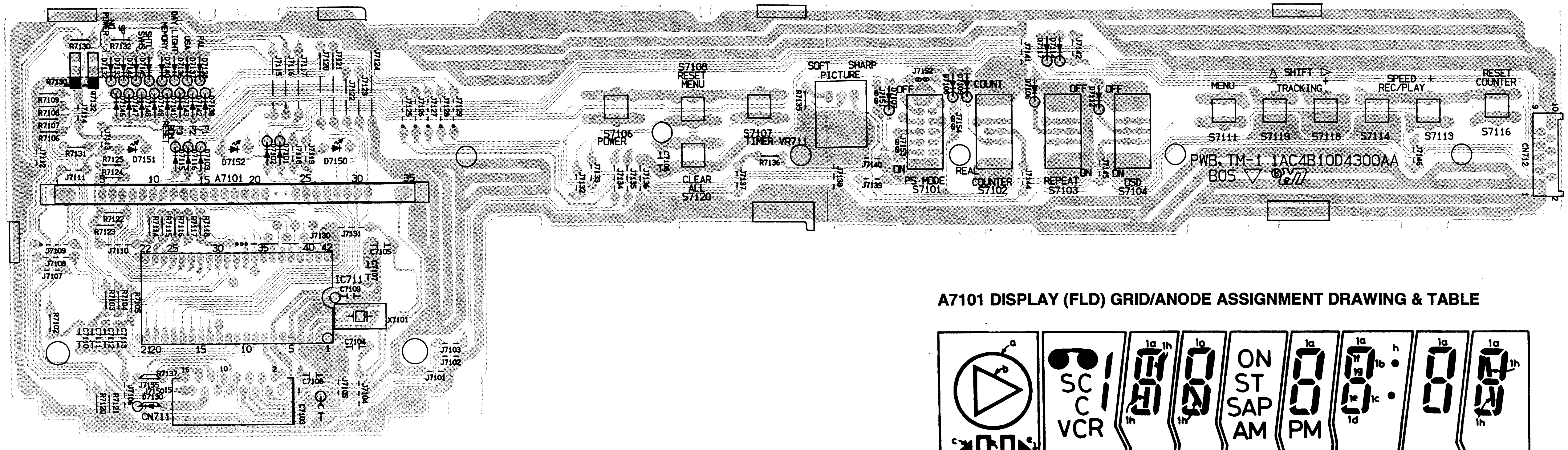
SVT-72P

A | B | C | D | E | F | G | H

2 HEAD DELAY


SELECT SW
IC122 BA7021
H/L
L/L
L/H
GND
VCC
1 2 3 4 5 6 7 8 9
Q1211
2SC2412
AMP
R1211 1K
C1211 27P
R1213
L1204 56U
1.5K
(1.4)
(4.0)
(4.3)
(2.4)
(2.0)
C1212 0.01
R1214 3.3K
R1212 1.5K
R1215 560
R1216 100
L1205 39U
C1213
R1218 820
(1.2)
(0.8)
BUF. 22P
Q1212
2SA1037
C1214 15P
L1206 39U
R1217
6.8K
Q1213
2SC2412
BUF.
R1219 1K
C1221 2.2/50
R1221 2.2M
R1222 47K
R1223 2.2M
C1222 2.2/50
R1224 100
R1225 1K
BUF.
Q1214
2SA1037
C1219 0.01
C1312 10/16
C1314 0.01
Q1201
2SC2412
AMP
R1202 1K
C1201 100P
L1201 39U
R1205 560
R1203 1K
Q1202
2SA1037
BUF
(1.8)
(1.4)
(2.4)
(2.0)
R1201 1.5K
C1202 0.01
R1204 2.7K
R1206 330
L1202 39U
C1203 33P
R1208 820
(2)
(0.8)
Q1203
2SC2412
BUF.
C1205 33P
R1207 4.7K
L1203 39U
C1206 39P
R1209 1K
(1.8)
(4)
J1331 0
R1269 47K
Q1269
DTC144EKA
SW
CN121
1 N.C
2 GND
3 COMB OUT
4 B/W
5 N.C
6 COMB IN
7 GND
TO CP-1(VD-A)
CN108
CN122
1 SWD 5V
2 N.C
3 N.C
4 PB 5V
5 N.C
6 ORC MUTE
7 GND
TO CP-1(VD-A)
CN107
VD-2
V4-80220/RE4Q-EXSY
VOLTAGE: REC(PLAY) MODE

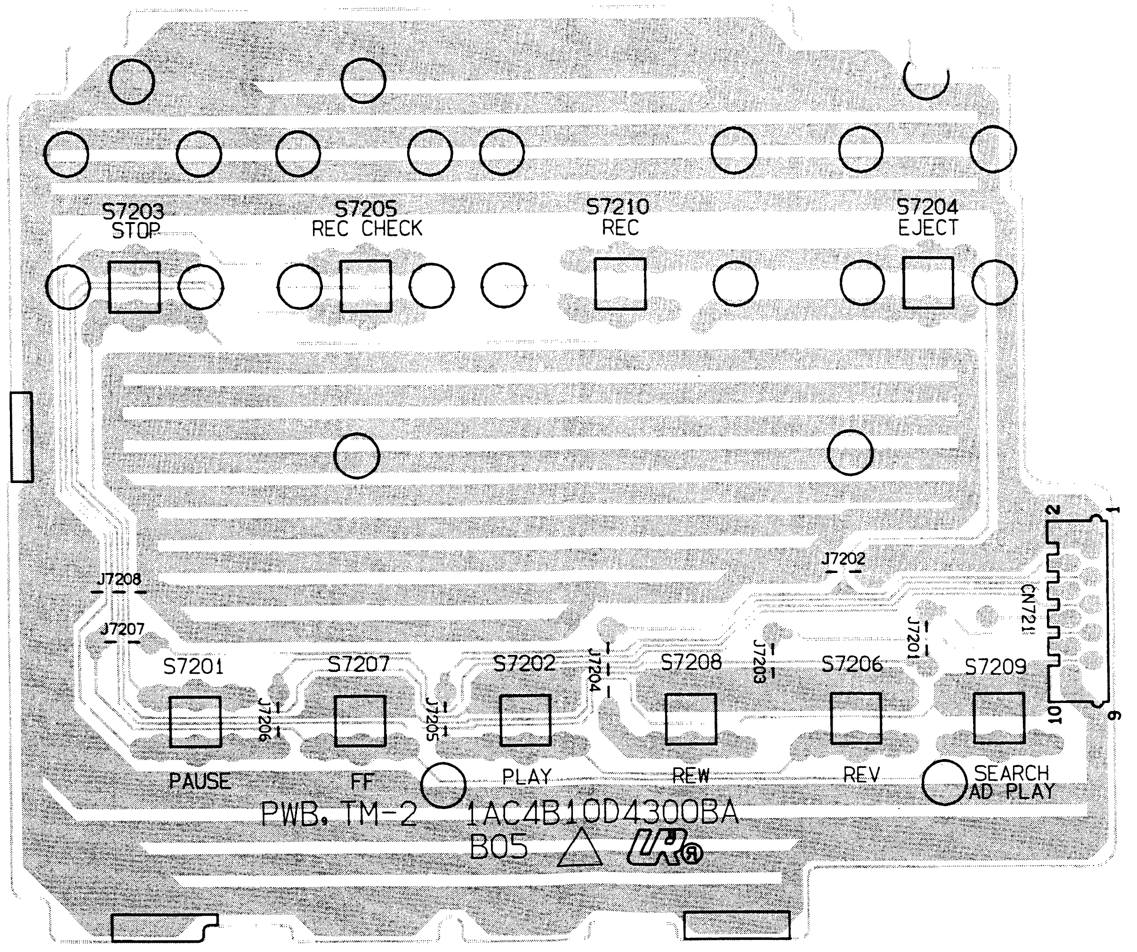
TM-1 P.W.B.


POWER
R7130
R7132
DAYLIGHT
USA
MEMORY
PAL
R7109
R7108
R7107
R7106
R7131
R7125
D7151
D7152
D7150
R7124
J7111
10
15
A7101
20
25
30
35
R7122
R7123
J7109
J7108
J7107
J7110
22
25
30
35
40
42
J7130
J7131
IC711
C7103
X7101
2120
15
10
5
1
C7104
J7103
J7102
J7101
R7137
J7155
CN711
C7100
C7105
J7104
S7108
RESET
MENU
S7106
POWER
S7107
TIMER
VR711
R7135
R7136
CLEAR
ALL
S7120
SOFT
SHARP
PICTURE
J7152
OFF
COUNT
ON
PS MODE
S7101
REAL
COUNTER
S7102
OFF
REPEAT
S7103
OFF
ON
OSD
S7104
MENU
S7111
△ SHIFT ▷
TRACKING
S7119
S7118
− SPEED +
REC/PLAY
S7114
S7113
RESET
COUNTER
S7116
CN712
PWB, TM-1 1AC4B10D4300AA
B05 ▽

1

2

TM-2 P.W.B.

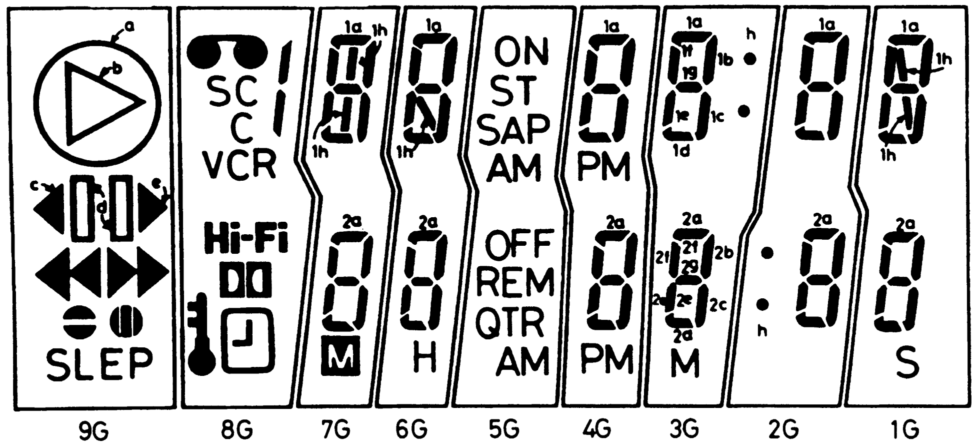

S7203
STOP
S7205
REC CHECK
S7210
REC
S7204
EJECT
J7202
J7208
J7207
CN721
J7201
S7201
S7207
S7202
S7208
S7206
S7209
J7206
J7205
J7204
J7203
PAUSE
FF
PLAY
REW
REV
SEARCH
AD PLAY
PWB, TM-2 1AC4B10D4300BA
B05 △
2
1
10
9

3

4

5

A7101 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE


a
b
c
d
e
SC
C
VCR
Hi-Fi
SLEP
1a
1h
2a
M
H
ON
ST
SAP
AM
OFF
REM
QTR
AM
PM
PM
1b
1c
1d
1f
1g
2b
2c
2f
2g
M
h
S
9G
8G
7G
6G
5G
4G
3G
2G
1G

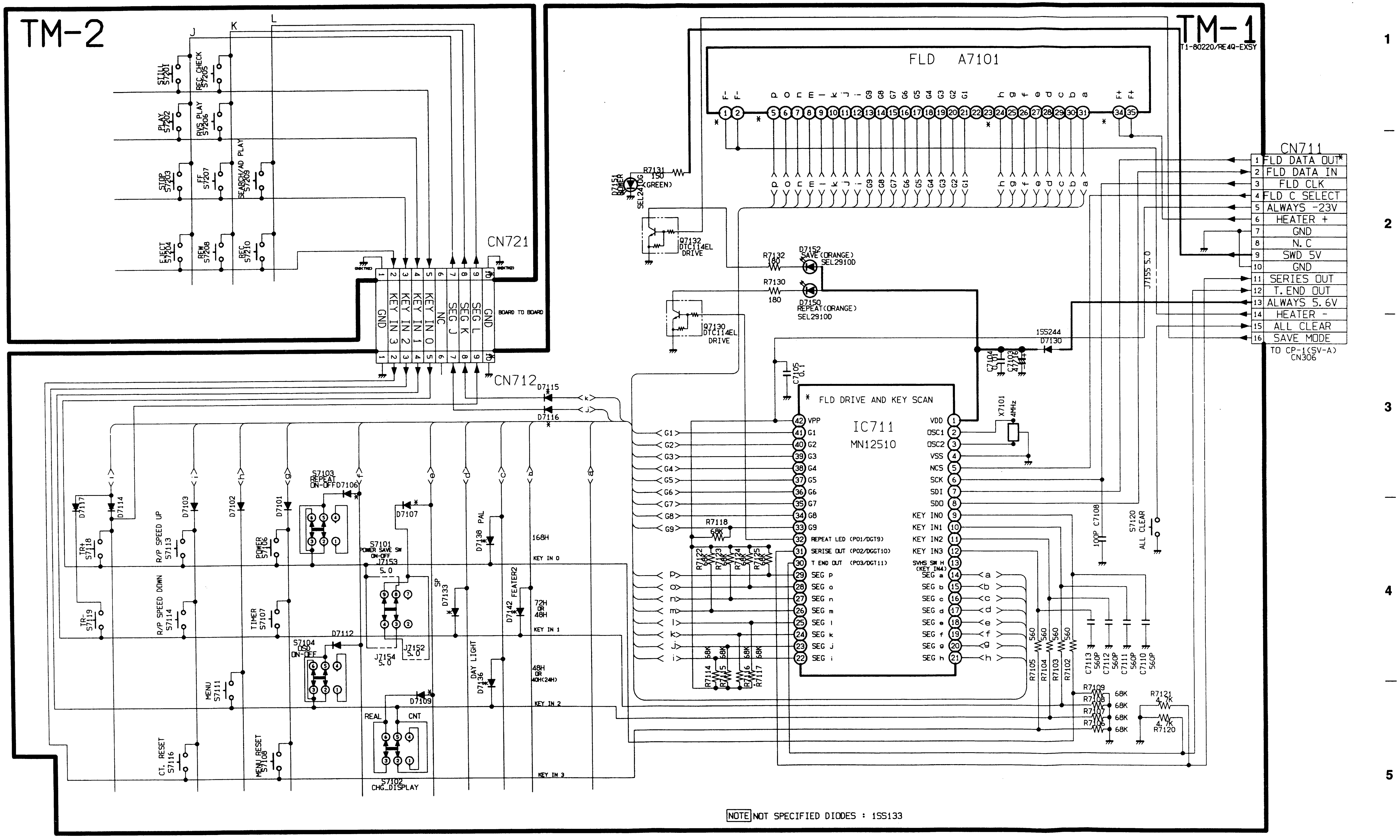
Segment ↓ / Grid →	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	○	●●	1a	1a	ON	1a	1a	1a	1a
b	▷	SC	1b	1b	ST	1b	1b	1b	1b
c	◀	/	1c	1c	SAP	1c	1c	1c	1c
d	[]	C	1d	1d	AM	1d	1d	1d	1d
e	▶	VCR	1e	1e		1e	1e	1e	1e
f			1f	1f		1f	1f	1f	1f
g			1g	1g		1g	1g	1g	1g
h			1h	1h		PM	• •	• •	1h
i	◀◀	DD	2a	2a	OFF	2a	2a	2a	2a
j	▶▶	Hi-Fi	2b	2b	REM	2b	2b	2b	2b
k	⊖	🌡	2c	2c	QTR	2c	2c	2c	2c
l	◍	⌚	2d	2d	AM	2d	2d	2d	2d
m	S		2e	2e		2e	2e	2e	2e
n	L		2f	2f		2f	2f	2f	2f
o	E		2g	2g		2g	2g	2g	2g
p	P		M	H		PM	M		S

← Grid

↑ Segment

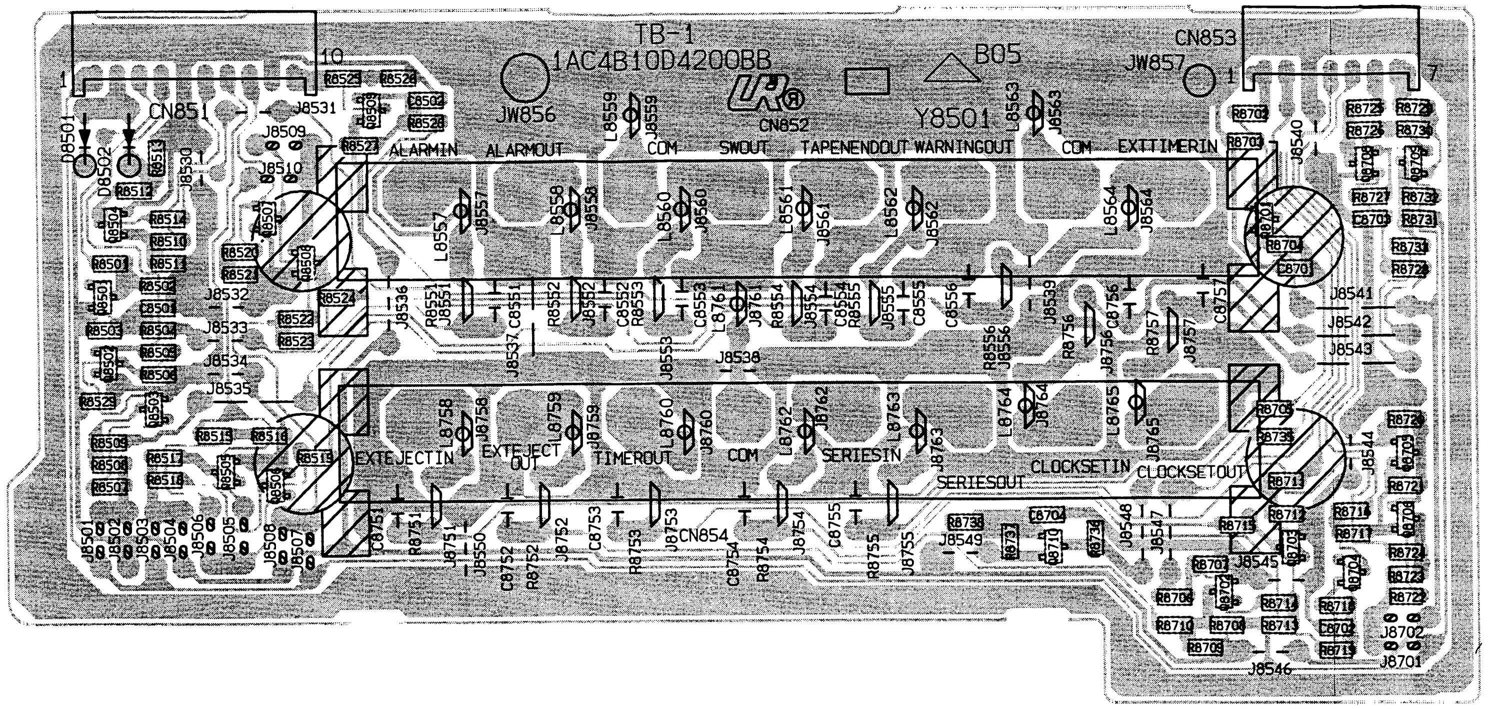
GR-01702-A

TIMER, DISPLAY (FLD) & SWITCH


TM-2
TM-1
T1-80220/RE4Q-EXSY
FLD A7101
CN721
CN712
BOARD TO BOARD
CN711
FLD DATA OUT
FLD DATA IN
FLD CLK
FLD C SELECT
ALWAYS -23V
HEATER +
GND
N.C
SWD 5V
GND
SERIES OUT
T.END OUT
ALWAYS 5.6V
HEATER -
ALL CLEAR
SAVE MODE
TO CP-1(SV-A) CN306
FLD DRIVE AND KEY SCAN
IC711
MN12510
X7101 4MHz
STILL S7201
REC CHECK S7205
PLAY S7202
RVS PLAY S7206
STOP S7203
FF S7207
SEARCH/AD PLAY S7209
EJECT S7204
REW S7208
REC S7210
GND
KEY IN 3
KEY IN 2
KEY IN 1
KEY IN 0
NC
SEG J
SEG K
SEG L
R7131 150
D7151 POWER SEL2410G (GREEN)
Q7132 DTC114EL DRIVE
R7132 180
D7152 SAVE (ORANGE) SEL2910D
R7130 180
D7150 REPEAT (ORANGE) SEL2910D
Q7130 DTC114EL DRIVE
1SS244 D7130
C7104 0.1
C7103 47/10
C7105 0.1
J7155 5.0
C7108 100P
S7120 ALL CLEAR
D7115
D7116
TR+ S7118
TR- S7119
D7117
D7114
R/P SPEED UP S7113
R/P SPEED DOWN S7114
D7103
D7102
D7101
POWER S7106
TIMER S7107
S7103 REPEAT ON-OFF
D7106
D7107
S7101 POWER SAVE SW ON-OFF
J7153 5.0
J7152 5.0
J7154 5.0
S7104 OSD ON-OFF
D7112
MENU S7111
CT. RESET S7116
MENU RESET S7108
D7109
REAL
CNT
S7102 CHG_DISPLAY
PAL
D7138
SP
D7133
FEATER2
D7142
DAY LIGHT
D7136
168H
72H OR 48H
48H OR 40H(24H)
KEY IN 0
KEY IN 1
KEY IN 2
KEY IN 3
R7118 68K
R7122 R7123 R7124 R7125 68K
R7114 R7115 R7116 R7117 68K
R7105 R7104 R7103 R7102 560
C7113 C7112 C7111 C7110 560P
R7109 R7108 R7107 R7106 68K
R7121 4.7K
R7120 4.7K
VPP
VDD
OSC1
OSC2
VSS
NCS
SCK
SDI
SDO
KEY IN0
KEY IN1
KEY IN2
KEY IN3
SVHS SW H (KEY IN4)
REPEAT LED (P01/DGT9)
SERISE OUT (P02/DGT10)
T END OUT (P03/DGT11)
NOTE NOT SPECIFIED DIODES : 1SS133
1
2
3
4
5
A
B
C
D
E
F
G
H

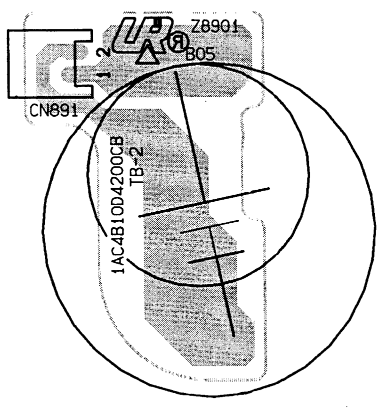
TERMINAL

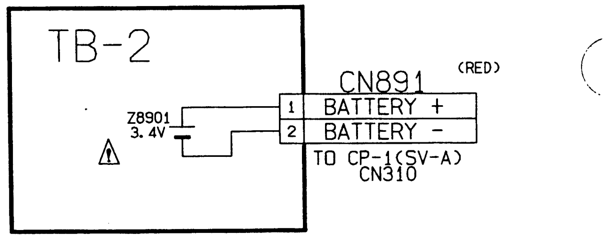
TB-1 P.W.B.

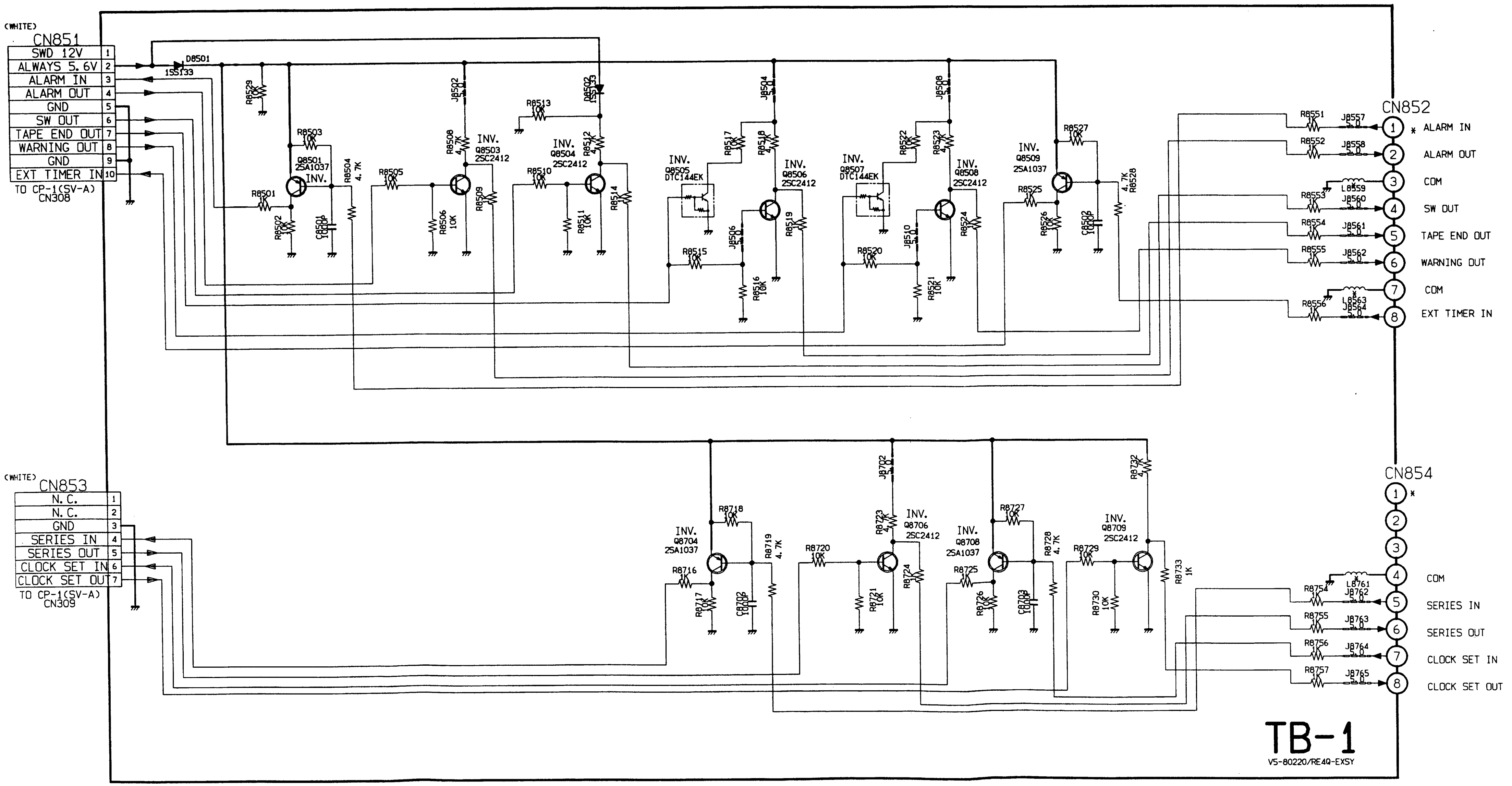

TB-1
1AC4B10D4200BB
B05
CN851
CN852
CN853
CN854
JW856
JW857
Y8501
ALARMIN
ALARMOUT
COM
SWOUT
TAPENENDOUT
WARNINGOUT
EXTTIMERIN
EXTEJECTIN
EXTEJECT OUT
TIMEROUT
SERIESIN
SERIESOUT
CLOCKSETIN
CLOCKSETOUT

BATTERY

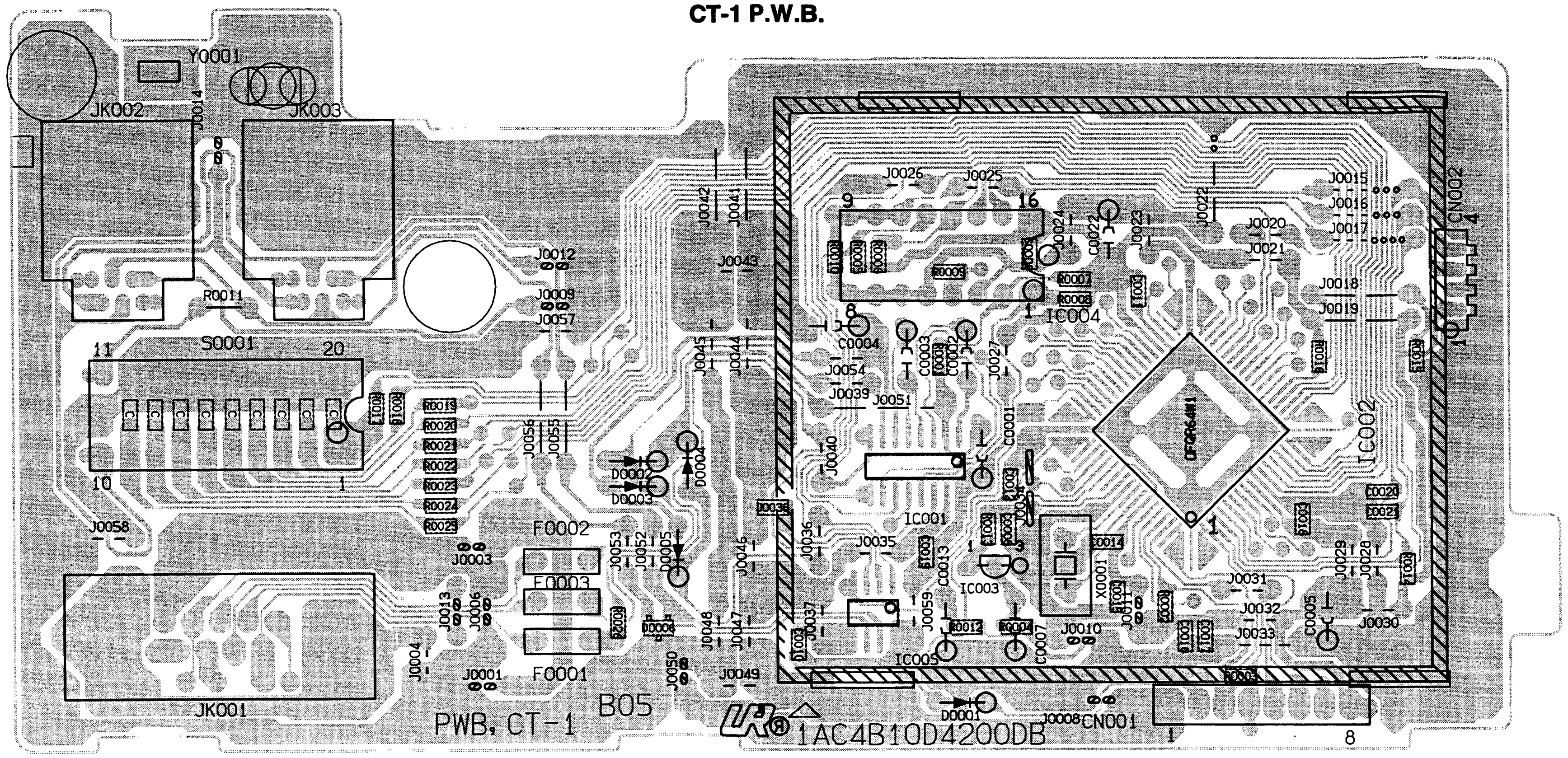
TB-2 P.W.B.


Z8901
B05
CN891
1AC4B10D4200CB
TB-2


TB-2
CN891 (RED)
Z8901
3.4V
1 BATTERY +
2 BATTERY -
TO CP-1(SV-A)
CN310


(WHITE)
CN851
1 SWD 12V
2 ALWAYS 5.6V
3 ALARM IN
4 ALARM OUT
5 GND
6 SW OUT
7 TAPE END OUT
8 WARNING OUT
9 GND
10 EXT TIMER IN
TO CP-1(SV-A)
CN308
D8501
1SS133
Q8501 2SA1037 INV.
Q8503 2SC2412 INV.
Q8504 2SC2412 INV.
Q8505 DTC144EK INV.
Q8506 2SC2412 INV.
Q8507 DTC144EK INV.
Q8508 2SC2412 INV.
Q8509 2SA1037 INV.
CN852
1 ALARM IN
2 ALARM OUT
3 COM
4 SW OUT
5 TAPE END OUT
6 WARNING OUT
7 COM
8 EXT TIMER IN
(WHITE)
CN853
1 N.C.
2 N.C.
3 GND
4 SERIES IN
5 SERIES OUT
6 CLOCK SET IN
7 CLOCK SET OUT
TO CP-1(SV-A)
CN309
Q8704 2SA1037 INV.
Q8706 2SC2412 INV.
Q8708 2SA1037 INV.
Q8709 2SC2412 INV.
CN854
4 COM
5 SERIES IN
6 SERIES OUT
7 CLOCK SET IN
8 CLOCK SET OUT
TB-1
VS-80220/RE4Q-EXSY

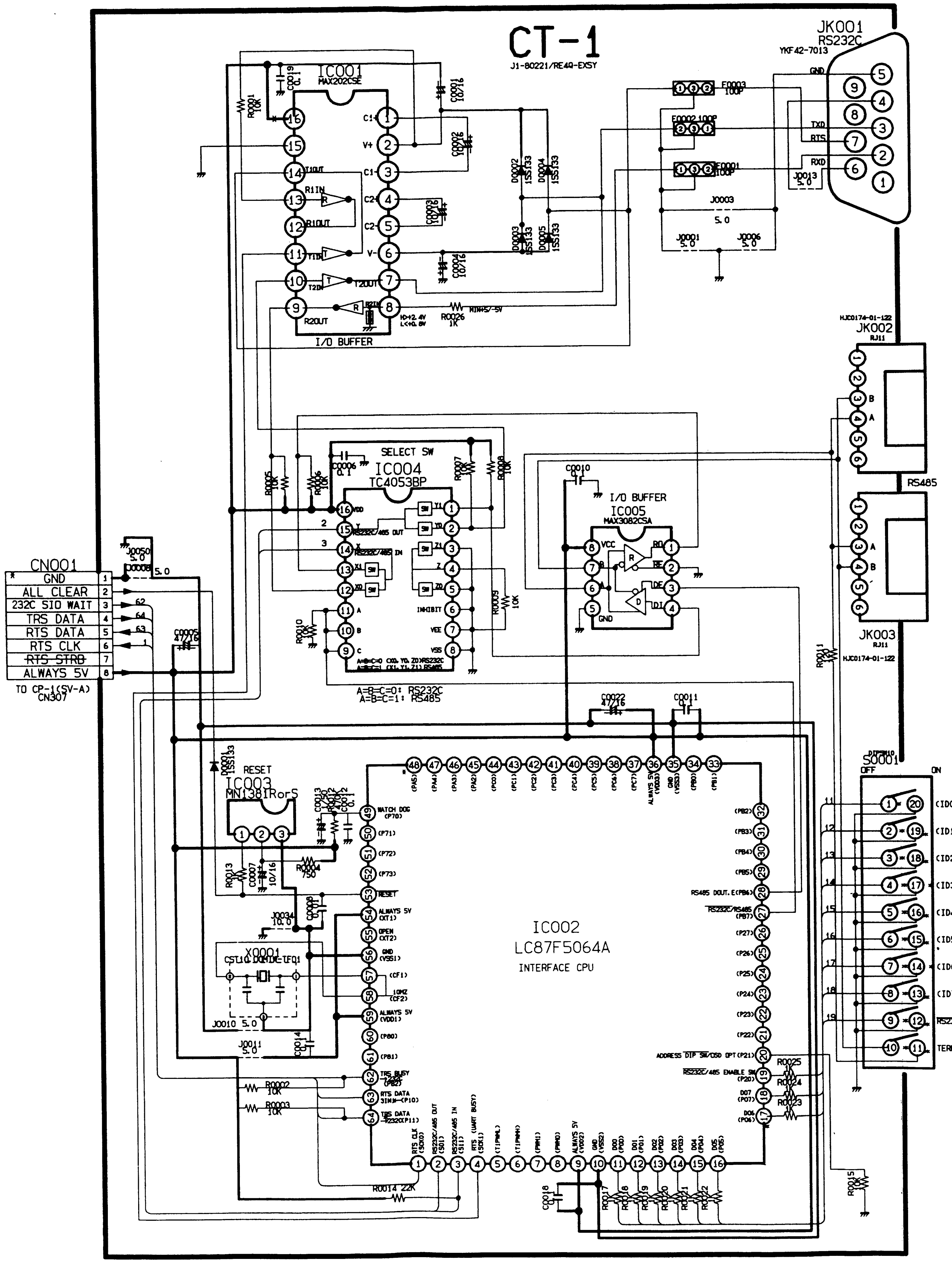
CT-1 P.W.B.


Y0001
JK002
JK003
S0001
11
20
10
1
R0011
J0058
JK001
F0001
F0002
F0003
J0003
J0004
J0001
J0012
J0009
J0057
J0042
J0041
J0043
J0045
J0044
J0026
J0025
IC004
IC001
IC002
IC003
IC005
CN001
CN002
X0001
D0001
D0002
D0003
D0004
D0005
J0015
J0016
J0017
J0018
J0019
J0020
J0021
J0030
J0031
J0032
J0033
PWB, CT-1
B05
1AC4B10D4200DB
1
8

IC002 INTERFACE MPU PIN FUNCTION TABLE

No.	Name	I/O	H/L	Signal Function
1	RTS CLK	O	-	Clock signal to system control CPU.
2	RS232C/485 OUT	O	-	Data to controller. (Through RS232C or RS485)
3	RS232C/485 IN	I	-	Data from controller. (Through RS232C or RS485)
4	RTS	O	-	Return signal to controller.
9	ALW 5V	-	-	Always 5V
10	GND	-	-	Ground terminal.
19	232C/485 SW	I	-	Signal to use RS232C or RS485. (232C = low)
20	DIP SW/OSD OPT	I	-	Use the data from dip switch for address or not. (Use the data = low)
27	232C/485	O	-	Signal to control RS232C/RS485 select switch. (RS232C = low)
28	485 OUT E.	O	-	Enable signal to RS485 data out.
35	GND	-	-	Ground terminal.
36	ALW 5V	-	-	Always 5V
49	WATCH DOG	-	-	Time constant for watch dog timer.
53	RESET	I	L	Initial reset terminal for this IC.
54	ALW 5V	-	-	Always 5V
56	GND	-	-	Ground terminal.
57 58	CF	-	-	IC clock OSC terminal. 10MHz.
59	ALW 5V	-	-	Always 5V
62	TRS BUSY	I	H	Signal indicating transferring signal is busy.
63	RTS DATA	O	-	Data to system control IC. (Return signal data)
64	TRS DATA	I	-	Data from system control IC. (Transferring signal data)

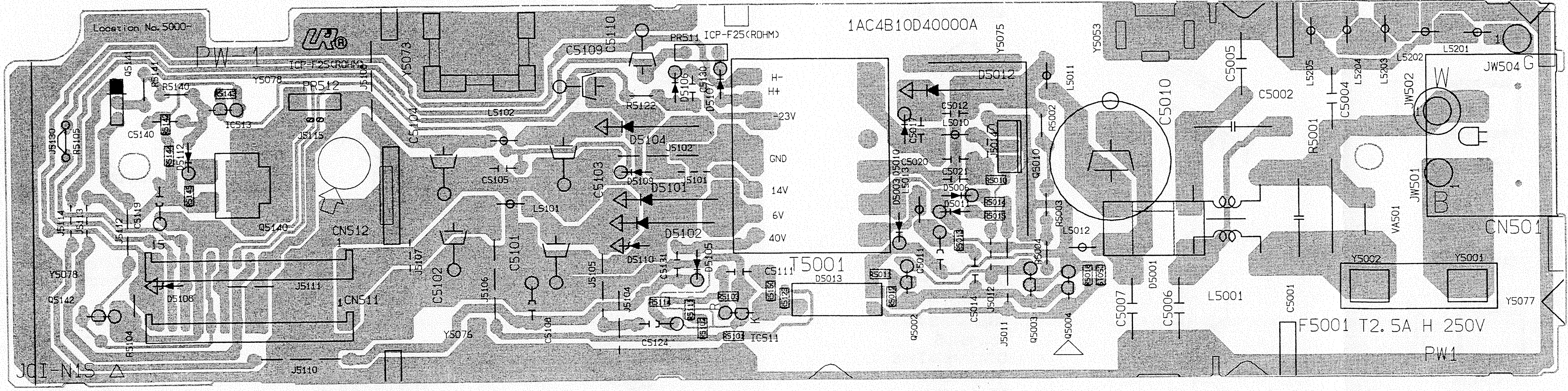
INTERFACE


CT-1
J1-80221/RE4Q-EXSY
JK001
RS232C
YKF42-7013
GND
TXD
RTS
RXD
IC001
MAX202CSE
I/O BUFFER
R0001 10K
C0019 0.1
C0001 10/16
C0002 10/16
C0003 10/16
C0004 10/16
D0002 1SS133
D0003 1SS133
D0004 1SS133
D0005 1SS133
F0001 100P
F0002 100P
F0003 100P
J0001 5.0
J0003 5.0
J0006 5.0
J0013 5.0
R0026 1K
RIN+5/-5V
T1OUT
R1IN
R1OUT
T1IN
T2IN
T2OUT
R2IN
R2OUT
C1+
V+
C1-
C2+
C2-
V-
JK002
RJ11
HJC0174-01-122
RS485
JK003
RJ11
HJC0174-01-122
SELECT SW
IC004
TC4053BP
C0006 0.1
R0005 10K
R0006 10K
R0007 10K
R0008 10K
R0009 10K
R0010 10K
R0011 10K
RS232C/485 OUT
RS232C/485 IN
INHIBIT
VEE
VSS
A=B=C=0: RS232C
A=B=C=1: RS485
IC005
MAX3082CSA
I/O BUFFER
C0010
VCC
GND
CN001
GND
ALL CLEAR
232C SIO WAIT
TRS DATA
RTS DATA
RTS CLK
RTS STRB
ALWAYS 5V
TO CP-1(SV-A) CN307
J0050 5.0
J0008 5.0
C0005 47/16
C0022 47/16
C0011 0.1
RESET
D0001 1SS133
IC003
MN1381RorS
R0013
C0007 10/16
R0004 750
C0012 0.1
J0034 10.0
X0001
CSTLS10M0X53-TF01
J0010 5.0
J0011 5.0
C0014
IC002
LC87F5064A
INTERFACE CPU
WATCH DOG (P70)
RESET
ALWAYS 5V
OPEN
GND (VSS1)
10MZ (CF2)
ALWAYS 5V (VDD1)
TRS BUSY
RTS DATA
TRS DATA
RS485 DOUT.E(PB6)
RS232C/RS485 (PB7)
ADDRESS DIP SW/OSD OPT (P21)
RS232C/485 ENABLE SW (P20)
R0002 10K
R0003 10K
R0014 22K
R0015
R0017
R0018
R0019
R0020
R0021
R0022
R0023
R0024
R0025
C0018
S0001
OFF
ON
(ID0)
(ID1)
(ID2)
(ID3)
(ID4)
(ID5)
(ID6)
(ID7)
RS232C/485 SW
TERMINATE SW

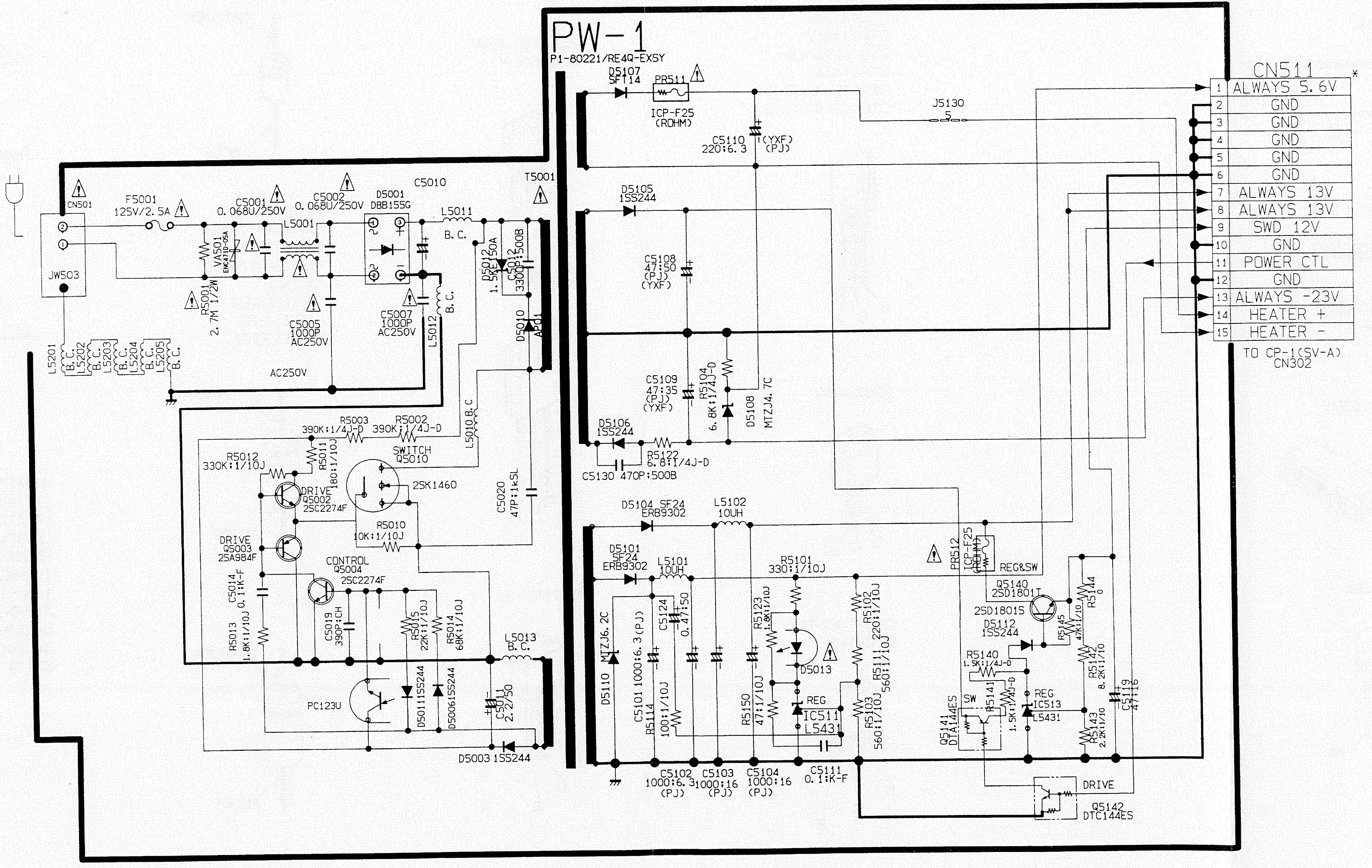
POWER SUPPLY

PW-1 PW-1

PW-1 P.W.B.



Location No.5000-
PW-1
1AC4B10D40000A
ICP-F25(ROHM)
PR511
PR512
T5001
H-
H+
-23V
GND
14V
6V
40V
C5010
C5002
C5005
C5004
C5109
C5110
CN512
CN511
CN501
JW501
JW502
JW504
D5012
D5101
D5102
D5104
Q5010
Q5140
Q5142
L5001
L5012
L5101
L5102
L5201
L5202
Y5001
Y5002
Y5077
Y5078
F5001 T2.5A H 250V
PW1
JCT-N1S



PW-1
P1-80221/RE4Q-EXSY
CN501
JW503
F5001 125V/2.5A
C5001 0.068U/250V
C5002 0.068U/250V
D5001 D8B155G
C5010
T5001
VA501
R5001 2.7M:1/2W
L5001
C5005 1000P AC250V
C5007 1000P AC250V
AC250V
L5011 B.C.
L5012 B.C.
D5012 1.5KE150A
C5012 330P:500B
D5010 A101
L5201 B.C.
L5202 B.C.
L5203 B.C.
L5204 B.C.
L5205 B.C.
R5003 390K:1/4J-D
R5002 390K:1/4J-D
R5012 330K:1/10J
R5011 180:1/10J
SWITCH Q5010 2SK1460
L5010 B.C
DRIVE Q5002 2SC2274F
DRIVE Q5003 2SA984F
R5010 10K:1/10J
C5020 47P:1kSL
CONTROL Q5004 2SC2274F
C5014 0.1:K-F
R5013 1.8K:1/10J
C5019 390P:CH
R5015 22K:1/10J
R5014 68K:1/10J
L5013 B.C.
PC123U
D5011 1SS244
D5006 1SS244
C5011 2.2:50
D5003 1SS244
D5107 SF114
PR511 ICP-F25 (ROHM)
C5110 220:6.3 (YXF) (PJ)
J5130
D5105 1SS244
C5108 47:50 (PJ) (YXF)
C5109 47:35 (PJ) (YXF)
R5104 6.8K:1/4J-D
D5108 MTZJ4.7C
D5106 1SS244
R5122 6.8:1/4J-D
C5130 470P:500B
D5104 SF24 ERB9302
L5102 10UH
D5101 SF24 ERB9302
L5101 10UH
R5101 330:1/10J
C5124 0.47:50
R5123 1.8K:1/10J
D5013
R5102 220:1/10J
D5110 MTZJ6.2C
C5101 1000:6.3(PJ)
R5114 100:1/10J
R5150 47:1/10J
REG IC511 L5431
R5111 560:1/10J
R5103 560:1/10J
C5102 1000:6.3 (PJ)
C5103 1000:16 (PJ)
C5104 1000:16 (PJ)
C5111 0.1:K-F
PR512 ICP-F25
REG&SW Q5140 2SD1801T
2SD1801S
D5112 1SS244
R5144
R5145
R5140 1.5K:1/4J-D
SW Q5141 DTA144ES
R5141 1.5K:1/4J-D
REG IC513 L5431
R5142 8.2K:1/10
R5143 2.2K:1/10
C5119 47:16
DRIVE Q5142 DTC144ES
CN511
TO CP-1(SV-A) CN302

	CN511
1	ALWAYS 5.6V
2	GND
3	GND
4	GND
5	GND
6	GND
7	ALWAYS 13V
8	ALWAYS 13V
9	SWD 12V
10	GND
11	POWER CTL
12	GND
13	ALWAYS -23V
14	HEATER +
15	HEATER -

1

2

3

4

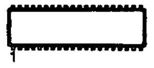
5

A | B | C | D | E | F | G | H

SEMICONDUCTOR

SEMICONDUCTOR

MN12510
TC4030BP TSB



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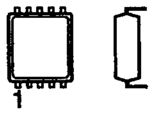
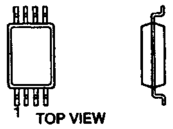


TOP VIEW

MAX3082CSA



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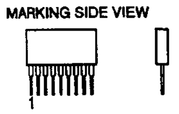
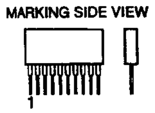

MARKING SIDE VIEW
1

LB1643


MARKING SIDE VIEW
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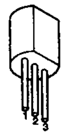
MN1381-H



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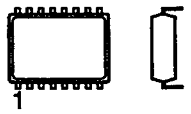
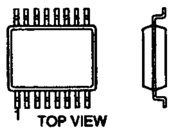
UPD4053BC



TOP VIEW

MAX202CSE



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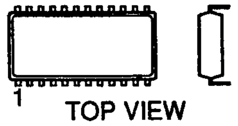
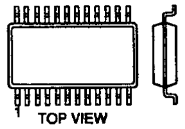


TOP VIEW

LA7285M-TRM



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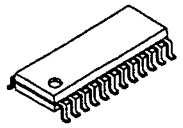

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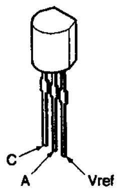

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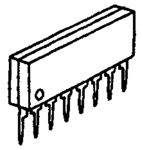

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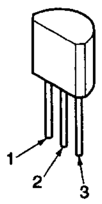

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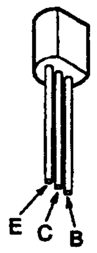

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2SC2840-D
2SC3331-S-AA
2SC4640S
DTA114EK-T146
DTA124EKA
DTA144EKA
DTA144ESA
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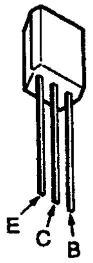

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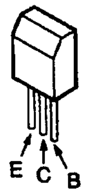

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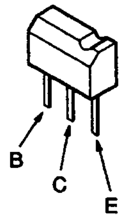

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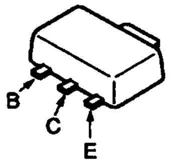

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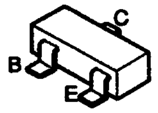

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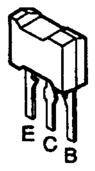

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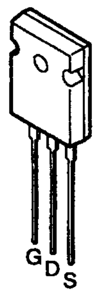

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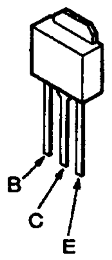

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RD15ES-B2
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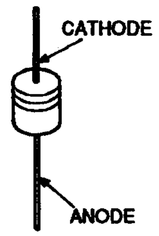
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ANODE

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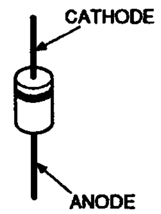
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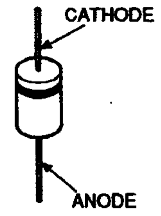
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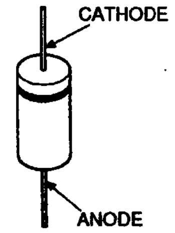
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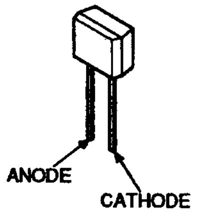
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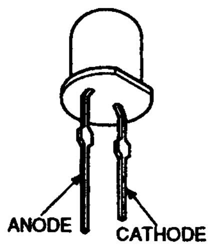
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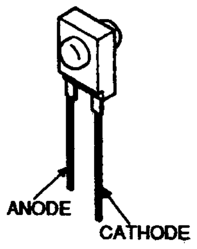
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